RAILROAD GAZETTE

FRIDAY, APRIL 19.

CONTENTS.

ILLUSTRATIONS:	PAGE.
Development of the Iron Bridge	253
"Security" Portable Stop Block	259
A Complication of Tracks at Sharpsville, Pa.	259
Willamette Bridge, Oregon Railway & Navigation Co.	260
The Mason Combined Reducing Valve and Steam Trap	265
EDITORIALS:	
Short-sighted Legislation	262
The Chicago-Kansas City Passenger Differentials	263
The Lorenzo Collision	263
Adjusting Southern Rates	264
EDITORIAL NOTES	262, 264
NEW PUBLICATIONS	265

GENERAL RAILROAD NEWS:	PAGE.
Meetings and Announcements	268
Personal	268
Elections and Appointments	268
Old and New Roads	269
Traffic and Earnings	270
MISCELLANEOUS:	
Technical	266
Railroad Law	266
The Scrap Heap	267
New Construction in 1889, 254,	256
Compound Locomotives	257
Improvements of the New York Central & Hudson River	259
Northern Pacific Colonist Cars	266
The Rules of Interchange	265

The Development of the Iron Bridge.

The following notes were sent to A. P. Boller by Squire Whipple a very short time before his death. Mr. Boller had in mind at the time a history of iron bridge building in the United States, and Mr. Whipple sent these notes as a contribution to that work. Besides their intrinsic value as history, they have an interest as the last words of the father of iron bridge building in America. The sketches are reproduced very nearly in fac simile from the manuscript of Mr. Whipple:

If we accept the one said to have been invented by Thomas Paine, of religious, political, and perhaps we should also say mechanical notoriety, of the character of which no authentic account seems to be extant, the first iron truss bridge erected and used in America (and probably the first in the world), was, as is believed, the one erected over the Erie canal, in the village of Frankfort, N. Y., in the year 1840, by Mr. Earl Trumbull (patentee), then residing at Little Falls, N. Y. The truss was a combination of the truss and suspension principles, and was formed of—first, seven cast-iron sections or panels of about 11 ft. in length and 7 in depth, cast solid, each segment consisting of an upper chord, a pair of diagonal braces and half of a hollow cylindrical post at each end (of the segment), except that the end segments had full cylindrical posts at the abutments. These semi-cylinders being bolted or clamped together in series, formed full cylindrical posts, which were flanged at the bottom, and through which were passed vertical bolts securing them to wooden transverse floor beams. Second, two wrought-iron suspension rods (1¼ in. diameter) attached to the top end of the end posts, and sagging in a parabolic curve, so as to pass under and support the two centremost floor beams, and under lugs cast at proper elevations upon the posts intermediate between the centremost and the end posts, whereby such intermediates were supported. Cross sections of cords and diagonal braces of the + formed section.

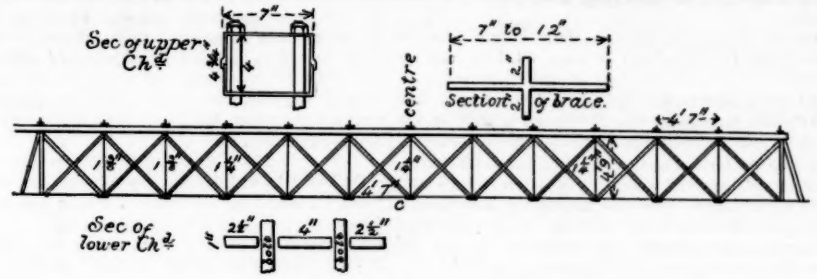
This pioneer bridge, after a few years of usage, broke down, probably, in part at least, in consequence of the wooden floor beams not affording sufficient transverse support to prevent a lateral buckling of the upper chord. The bridge was rebuilt with cast-iron lattice beams, which served a better purpose. But I think it stood only a few years, and the plan never achieved any considerable degree of popularity, the one above described and a foot bridge over the Erie Canal at West Utica having been, to the writer's belief, the only ones of the kind ever erected.

The same year (1840) witnessed my first effort at iron truss bridge construction, and the plan of my independent cast-iron arch truss, for which letters patent were issued April 24, 1841, was conceived on the 22d day of August, 1840.

The design and intent were to construct an iron truss to be used in connection with a wooden floor system, the truss to have sufficient stability to stand of itself, without any dependence upon the wood, so that the latter could be renewed from time to time as might be required, without disturbance or danger to the iron work. And, as an evidence of the complete success of the effort, it may be mentioned that a single model truss six feet long (scale $\frac{1}{12}$ size) sustained without transverse support or assistance of any kind, a load of 900 lbs. (representing 129,600 lbs. upon a full size truss) without the least indications of yielding, or want of complete stability.

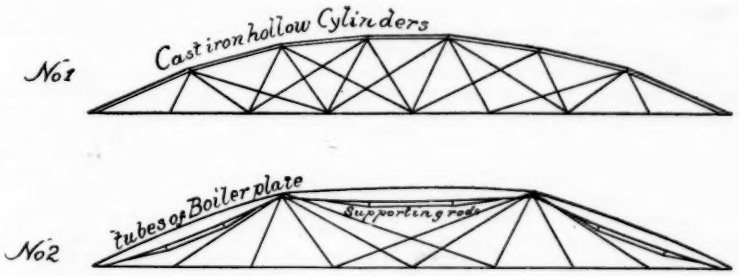
That style of bridge was designed especially for the use of the Erie canal enlargement, and was the first plan that ever achieved success and popularity, and was early adopted for the State canals, as far and as fast as the want of confidence in the safety of iron as the principal supporting material in bridge construction was compelled to give way before the light of experience.

This truss for spans from 50 to 100 ft. (and there are several in use as long as 180 ft. or more), especially for common road purposes, has ever been regarded with favor by those best acquainted with its qualities, but in consequence of the efforts of persons interested in competing plans, and improvements made in the means and methods for manufacturing wrought-iron work, together with what I have ever regarded as a groundless distrust of the safety of cast iron in bridges, wrought iron is now almost exclusively used in the construction of modern bridges. By this means a considerable saving of expense of pattern work is effected, while wrought iron manufactured for the work can be produced about as cheaply as bridge castings.



Howe Truss Iron Railroad Bridge

Examined by S. WHIPPLE *in June, 1853, at Cleveland, O. From Notes taken at the time.*



Simms' Plans.

No. 1 broke down at Utica with a few head of cattle, and was replaced with No. 2 in 1852.

Prior to 1846, or thereabouts, I had regarded the arch-formed truss as probably, if not self-evidently, the most economical that could be adopted; and at about that time I undertook some investigations and computations with the expectation of being able to demonstrate such to be the fact, but on the contrary the result convinced me that the trapezoidal form, with parallel chords and diagonal members, either with or without verticals, was theoretically more economical than the arch, and that the trapezoid was more economical *without than with* vertical members—there being shown a less *amount of action* (sum of maximum strains into lengths of respective long members) under a given load.

Furthermore, it was apparent that each of the three forms—the arch, and the trapezoid with and without verticals, possessed certain practical advantages entitling each to preference in respective cases. And, no other forms or combinations presenting themselves which seemed capable of competing successfully with these, they were assumed by me as those which would be the prevailing forms which coming practice would adopt, a conclusion which the experience of 40 years seems to have fully justified, although great effort has been made to supersede or materially modify them.

It is true that certain improvements in details have been rendered practicable by the improved methods of manufacturing wrought-iron work. For instance, eye bars for lower chords and tension diagonals can now be rapidly forged of approximately exact lengths, whereby open links for chords and screw adjustments for diagonals, as first used by me, have been advantageously dispensed with and superseded, while improvement in the process of riveting, the invention of the Phœnix column, etc., have enabled posts and upper chords, either square or cylindrical, to be cheaply manufactured of wrought iron.

At the time when I entered the field as a candidate for the honors and profits of skillful bridge construction, nearly all the principles and feasible general combinations had long been in use. So there was little for me to do but to select the best combinations, best materials, and the proper dimensions and proportions of the several parts and members to secure adequate strength without waste of material or unnecessary expense of labor and workmanship. And my investigations and computations of the maximum stresses to which the several parts of the truss are liable, are believed to have laid the first permanent foundation of a really scientific practice of bridge building, to take the place of empirical practice previously in use. For instance, the Howe truss, so popular as a railroad bridge before the advent of the *iron* railroad bridge being built with same sized bolts and braces throughout the length, was found on crucial test to give out uniformly in the bolts near the ends. It was thence suspected that the strain was greater at those points, and the bolts were increased in size and number as much as was *guessed* to be necessary to enable them to bear the strain. And that being attained, the structure was assumed to be sufficient, without regard to any "*factor of safety*," or the ratio of strain to the absolute strength of material.

The Rider Bridge.

Among the early competitors for public favor and patronage in the purchase and use of iron bridges was a company in New York, formed under the title of "The New York Iron Bridge Co.," for the purpose of making and erecting bridges under a patent granted to a Mr. Rider. I don't know the date of the patent. The plan of truss was upper chord and vertical posts of cast iron, and lower chord and diagonal ties of wrought iron, diagonals connected with chords by bolts and eyes at each end, and posts wedged between chords to give tension to diagonals.

A bridge built by this company on the Harlem Railroad, of about 70 ft. span, two trusses carrying two pairs of ways, examined by me, and described and criticized in a communication to the *American Railroad Journal* published Nov. 27, 1847, page 754, had 7⅛ ft. depth of truss, and only 3 sq. in. of available cross-section in lower chords at centre of truss, upon which a live load of *only* 1,000 *lbs.* per lineal foot upon one track would give, with weight of structure, over 26,000 lbs. per sq. inch. I do not know the ultimate fate of this bridge, but another structure by the same company, and of the same plan and same span upon the Erie Railroad, broke down with, I believe, fatal results in 1850.

An Iron Howe Bridge.

In April, 1847, I inspected an iron railroad bridge upon the North Adams Branch of the Boston & Albany Railroad, a few miles North of Pittsfield. This seems to have been an attempt to build a Howe bridge with cast-iron upper chords and braces, and wrought-iron lower chords and vertical bolts. The members were all hollow, cylindrical, except the bolts; lower chord of boiler iron $\frac{3}{16}$ in. thick, riveted up with two longitudinal seams, and 6 in. in diam., two to each truss. Upper chord, also of two cylinders, about 4½ in. diam., and braces also 4½ in. diam., two main and one counter to each panel.

This bridge was 30 feet in clear span and contained 8 panels of 4 ft. each, with 6 ft. depth of truss. Weight of iron, 15,378 lbs. cast and 4,028 wrought; cost, $1,100. It could scarcely be supposed to be deficient in strength with so much iron in so short a span. I recognized the same structure standing beside the railroad at Pittsfield (out of use, of course), the last time I passed that city, some four or five years ago.

The two bridges above described, as far as I have ever learned, were the first iron truss bridges ever erected for railroad purposes in this country; the one extremely light (at least in parts) and the other excessively heavy throughout, and neither adopted to the intended purpose.

Having thitherto occupied a place somewhat in the background, with regard to railroad bridges, being less aggressive in habit and disposition than some others, it became the writer's turn in 1848 to exercise his hand in the construction and erection of a couple of small bridges of 40 ft. and 50 ft. spans, on the Erie railroad, at Binghamton, under the administration of our excellent friend, Col. J. W. Adams, as Division Engineer. The 40 footer was upon the patent independent arch plan, and the other a trapezoidal, deck bridge. The former with 5 panels, 6 ft. depth of truss, open chord links, 1½ in. round iron (4 sq. in. to the truss), verticals 1¾ in. round iron, diagonals 1¼ in., single; arches, 8 in. to 10 in. in cross-section, and wooden beams and track stringers.

The trapezoid had six panels, 8 ft. 8 in. depth of truss, upper chord and end braces of cast-iron hollow cylinders, 6 in. in diameter and about $\frac{5}{16}$ in. thick; end braces cast in two pieces and joined by bolts and flanges. Verticals of the + formed section with connecting blocks or pins cast upon the lower ends to receive the chord links upon the ends, and the diagonals through holes in the enlarged central portions. Trusss 8 ft. apart, with struts and horizontal diagonals between upper chords and end braces. Open chord links of 1¼ in. iron (5 sq. in. section to the truss) in the two middle, and 1 in. iron in the other panels. Main diagonals in pairs and counters single, and in size from ¾ in. to 1¼ in. diameter, according to respective liabilities to strain. Beams and track stringers of wood.

These bridges were proportioned for a live load of 2,000 lbs. per lineal foot with tension strain of 10,000 lbs. to the square inch. They were tested with about 1¼ tons to the foot and used under railroad traffic about two years, being then removed in deference to a panic excited by the failure of

the Rider bridge upon the same road, already referred to in this sketch.

The writer's remarks upon that failure may be found in the New York *Daily Tribune* of Aug. 14, 1850, and the *American Railroad Journal*, Aug. 31, 1850, page 550.

In 1849 the present writer built two 40 ft. trapezoidals near the Chester junction of the Newburgh branch of the Erie road. These contained upper chords and end braces of cast-iron with ⊓ formed section, cast-iron posts of I section, trussed beams of cast and wrought iron, lower chords and diagonals formed and connected as in the Binghamton trapezoid, and wooden track timbers. They were used about one year, and removed at the same time and for the same reason as in the case of the Binghamton bridges.

The same fate befell three small structures by the same party, of 23 to 26 ft. span, to carry the Newburgh branch over common highways at and near that village. These were wrought-iron skeleton girders upon the triangular plan, such as have since been called Warren girders, and by some regarded as a newly invented combination. But they are merely trusses with parallel chords and diagonal, or rather, oblique members, with only one series of obliques, and without verticals, except to concentrate weight upon the obliques from intermediate points along the upper or lower chord, according as the girder is loaded at such upper or lower chord.

Thus passed the first decade of my experience in iron bridge labors and studies. The result showed no remarkable progress in the adoption of the use of iron bridges, especially railroad bridges. But early in the latter half of the present century, a new era seems to have dawned, insomuch that, whereas in 1850 there was not an iron railroad bridge in this State, if in any other, which had not been condemned, thirty years later there were scarcely any other.

But to proceed in historical order: In 1851 a sufficient number of iron canal bridges had been built, and had been in use long enough to inspire confidence in their safety and value, and render them so popular that whenever a new bridge was required, an iron bridge was uniformly petitioned for, and generally adopted. And in the last named year, it having been determined to put under contract all the remaining work of the Erie canal enlargement, the general adoption of iron bridges was included as a part of the policy and programme. There and then seemed to be an opening for a considerable amount of iron bridge work, and it called forth competition from numerous quarters, and withal from the writer hereof. The result was such as to incite the production of a small pamphlet (herewith transmitted), in which and by which the humble author was by some thought, and perhaps correctly thought, to have "made a fool of himself." I will not assume to decide that issue.

Most, and, as far as I know, all the parties having had part in the matters then had under discussion, have gone to their final rest, except the present writer. It seems, however, that his action upon the occasion was taken in dudgeon by some parties, to the effect that a strenuous effort was made to *boycott* the Whipple bridges upon the State canals; whence it came to pass that some half-score, more or less, of Bollman bridges were erected over the canal at Rochester and other localities at unnecessarily large expense. Also several upon the Capt. Simms plan. These bridge plans, however, never gained much foothold in public favor, and their use was confined to narrow limits, while the Whipple bridge was soon restored to its former position as the public favorite, and this matter need not be dwelt upon on the present occasion.

Early Iron Railroad Bridges.

In 1852-3 the first iron railroad bridge of considerable span (as things were then looked upon), being 150 ft. to centres of bearings, was erected upon the Whipple trapezoidal plan on the (then) Albany Northern Railroad, at the crossing of the Erie Canal, between the cities of Albany and Cohoes. That bridge excited much interest at the time, and no little doubt was entertained as to its apswering the requirements of the case.

It was, however, severely and successfully tested, even to the crushing of the abutments, and continued in use for some 30 years, when it was removed (being still in good condition generally) to give place to a double track bridge. It was a wrought and cast-iron structure, with wooden beams and track stringers.

A bridge of the same description, but somewhat shorter (about 125 ft.), was built by the same parties (S. & J. M. Whipple) in the year 1854 for the Black River & Utica Railroad at Utica, which is still in use (1886), and believed to be the oldest iron railroad bridge in use, of as long span.

The same parties also constructed a trapezoidal deck bridge of 70 to 80 ft. span for the same road near the village of Boonville, Oneida County, in 1855, which is also still in use, although proportioned like the two preceding structures for only 2,000 lbs. to the lineal foot, while engines and loads upon the road have been increased to very much greater weights than were anticipated at the time of their construction.

During the decade from 1850 to 1860 the above-named parties erected over the state canals, and other water courses, for common highway purposes, a large number of both arch and trapezoidal truss bridges, to the number, probably, of 100 or more, when, at about the latter period, the senior partner substantially retired, and, with slight exceptions, has not been since engaged in practical bridge construction.

In the meantime, J. M. Whipple has continued the building of bridges for the Black River Railroad, its extensions and connecting lines at the north, and for towns of Oneida and other counties of the state of New York, which will long stand as creditable monuments of his skill and industry.

Since the year 1860, S. Whipple has erected some one dozen bridges, including, besides seven or eight arch-truss bridges of small span, a trapezoidal deck bridge of 120 ft. at Sing Sing, New York; a swing draw-bridge of 90 ft. opening at Louisville, Ky.; a swing draw and a lift draw-bridge, each of 60 ft. opening, over the Erie Canal at Utica, New York, and a trapezoidal bridge of 160 ft. span at Glenham, Dutchess County, New York.

The Whipple Lift Draw-bridge.

On Dec. 24, 1872, letters patent were granted him for a "lift draw-bridge," of which the first one was built by himself, at Utica, in 1875, as above stated. And since that time several others have been erected by other parties at Rochester and other places, modified according to circumstances as to the mode of applying the working power, but containing the same characteristic and governing principles and features as the one constructed by the patentee, and specified in his letters patent. But he has not seen fit to incur the vexation attending a contest for the collection of royalties on patent rights, while canal officers and canal contractors are not over conscientious in regard to the rights of patentees.

The preceding sketch seems to contain about all the facts and data required to enable a fitting commemoration to be made of the part borne by the undersigned in developing the art and mystery of truss bridge construction within the last half century. Nothing has been said as to his contributions to the bridge literature of the century—for, are they not all written in the annals of the years?

SQUIRE WHIPPLE,
227 State street, Albany, N. Y.

TO ALFRED P. BOLLER, 71 Broadway, N. Y.

New Construction in 1889.

We give herewith a table showing the new track laid during the first three months of the current year in the various states and in Canada and Mexico. The table also shows the lines now under construction and those surveyed or under survey. The lines under this last heading include roads upon which surveys were made during the year 1888. Only those projected lines are given upon which it seems likely that considerable work will soon be done.

Our thanks are due to the officers, who, at considerable trouble to themselves, have given us the information which makes the table so full and accurate as it is.

The new track laid is, by states, as follows:

Alabama	2.34	Ohio	2.7
California	39.95	Pennsylvania	7.7
Colorado	5.03	Tennessee	.60
Connecticut	.5	Texas	15
Georgia	36	Virginia	4.5
Indiana	4	Washington	21.5
Kansas	12.2	West Virginia	7
Kentucky	14.6		
Maryland	2.2	Total, U. S.	473.8
Michigan	13.	Manitoba	15
Mississippi	45	New Brunswick	10
Missouri	27	Nova Scotia	3
Montana	43.9	Mexico	84.2
New Jersey	19		
New York	29.5	Total, foreign	112.2
North Carolina	59	Grand total	585.

In another column we have made some comment upon the significance of the table of new railroad construction. There are some particulars which it might be interesting to speak of more in detail.

One of the most striking facts is the small amount of work doing by the great companies which in the past three years have built a great mileage into the comparatively undeveloped areas of the West. The Atchison, the Rock Island, the Northwestern, the St. Paul and the Manitoba report no new track laid or lines under construction, but the Southern Pacific, which built over 200 miles last year, will probably build extensively again this year. It has a line graded from Newman to Tulare, Cal., 110 miles, and has made surveys for a number of lines which will be put under construction during the year. A branch in Texas 55 miles long is nearly all graded. The Burlington & Missouri River reports 150 miles under construction, from Alliance, Neb., northwest into Wyoming, but work on this line does not appear to be making progress. The Northern Pacific has built nearly 50 miles in Montana, and reports no other lines under construction, at present. The Northern Pacific & Manitoba is rapidly building its line from Winnipeg to Portage la Prairie, and will soon put under contract the line from Morris to Brandon.

We have spoken elsewhere of the short length of line built by any one company. The longest is 45 miles, on the Georgia Pacific, from Columbus, Miss., west. The entire line to Baird will probably be built this year. The construction of the line to Huntington, Ark., will give the Richmond & Danville a connection with the Missouri Pacific.

The longest line now under construction is the Alabama Midland, from Bainbridge, Ga., to a point south of Montgomery. The company secures an entrance to that city over the Northwest & Florida, which it controls. This road will be operated in the interest of the Plant System, which will thus secure important connections at Montgomery. The work of construction is being carried on vigorously and well. It is expected that the road will be opened next September.

In New England there are a number of projects in a more or less advanced stage. It appears probable that part of the Northern Maine will be built this year, and in New Hampshire a number of short lines are likely to be completed.

In New York a number of new lines are planned. The connecting lines to the Poughkeepsie Bridge are well under way, and will soon be open to traffic. The opening of this bridge has resulted in several projects, some of which are sure to be carried out. The New York, Ontario & Western and the Lehigh Valley will build into the coal-fields at Forest City and Pottsville, and a new line into the Beech Creek coal fields, near Williamsport, is also projected.

In Maryland the Deer Creek & Susquehanna is building 15 miles, to be part of the Maryland Central. The Baltimore & Drum Point has graded many miles in the Eastern peninsula and expects to complete a large part of the road this year, but at present the work is not going on very actively.

In Virginia the grading of the Farmville & Powhatan, 65 miles, is completed, and tracklaying will commence at once. The Lynchburg & Durham is pushing on southward, and the Norfolk & Western is still carrying on work of construction.

In West Virginia there is much activity. The West Virginia Central will build southward from its present terminus. The Monongahela River road will soon put under contract a line from Fairmont to Clarksburg, and surveys will be made for the Weston & Elk River from Weston to Braxton. The Clarksburg, Weston & Elk River, connecting these lines, will be made standard gauge. The Norfolk & Western has surveyed a line through the state from Flat Top coal fields to the Ohio River.

In North Carolina the Atlantic Coast Line has laid out considerable work, and has already completed 24 miles. Thirty-eight miles more is now under construction and surveys have been made for 65 miles. The Cape Fear & Yadkin Valley is still grading on the extension to Wilmington and has surveyed a short line to connect with the Norfolk & Western survey from Ivanhoe. The Richmond & Danville is building over 100 miles in different parts of the state. The Norfolk & Carolina is building 87 miles to connect the Richmond & Danville with the Atlantic Coast Line. The Roanoke & Southern is building northward from Winston to Martinsville, Va. The Charleston, Cincinnati & Chicago has now a completed line from Camden, S. C., to Rutherfordton, N. C., has under contract nearly 200 miles to the Breaks of the Sandy, and has completed surveys to the Ohio River in Kentucky.

In Georgia, over 400 miles of new road was built last year, and there is still great activity. The Central of Georgia has built 20 miles and is working on 13 more. The Columbus Southern has nearly graded 87 miles and the Empire & Dublin proposes to build 32 miles. The Georgia Southern & Florida has under construction 60 miles, to Lake City, Fla., and proposes to build to Palatka, 68 miles further. The Savannah, Americus & Montgomery is building a 25 mile extension and proposes to go to Savannah and to Montgomery; final surveys for these roads have not, however, been made.

In Tennessee the Knoxville, Cumberland Gap & Louisville is building from Knoxville to Cumberland Gap, where it will connect with lines now building by the Norfolk & Western and Louisville & Nashville. The Knoxville Southern is building southward to a connection with the Marietta & North Georgia. The Richmond & Danville is also building an extension to Murphy, N. C., to a connection with the latter line.

In Ohio a number of long and important lines are under construction or contract, but the work does not seem to be going on very rapidly.

In Indiana the Evansville & Richmond, an extension of the Evansville & Terre Haute, is the most important project building. The section from Elnora to Seymour is now being graded. The Evansville, Fort Wayne & Chicago has 108 miles under contract, but construction has not begun. The Indianapolis, Decatur & Western has surveyed an extension of 81 miles to Beardstown.

In Michigan the Toledo, Ann Arbor & North Michigan has 62 miles under contract and 75 miles surveyed, much of which it is supposed is to be contracted for during the year. The Ontonagon & Brulé River is building 26 miles in the northern peninsula, and the Grand Rapids and Northern is making surveys near the western part of the State. The Manistee & Northeastern also proposes to do something.

In Wisconsin the only long line under construction is across the Flambeau Indian Reservation, building by the Milwaukee, Lake Shore & Western. This line was completed to the south side of the reservation last year, but permission to cross the reservation was obtained too late to continue the work at that time. The Wisconsin Midland has done a good deal of surveying, but it is not considered likely that much work will be done this year.

In Minnesota the Duluth, Red Wing & Southern and the Winona & Southwestern have made extensive surveys and built some line.

In Missouri, Arkansas and Louisiana considerable new mileage is projected, but, excepting 23 miles completed in Missouri and 67 under construction in Louisiana, there are no important lines on which work is in progress.

Texas has always been prolific in new projects, and at present many miles of road have been surveyed and a few contracts let. The San Antonio & Aransas Pass will probably construct a good deal this year. In the other Southwestern states and territories there has so far been little activity.

In Washington Territory, also, there is a good deal of line projected, but little track has yet been laid. The Fairhaven & Southern has under contract 30 miles, and the New Westminster, Bellingham Bay & Seattle has 44. The Seattle, Lake Shore & Eastern is not building as much as has been expected. The Oregon Railway & Navigation Co. is building a large new mileage and the Spokane Falls & Northern proposes to build from Spokane Falls to the Columbia River. This latter, however, is not yet assured.

In Canada the extension of the Canadian Pacific from Windsor, Ont., to London, opposite Detroit, is a line of much importance. In Newfoundland the government has called for proposals for 250 miles of new road, and in Nova Scotia the Oxford & New Glasgow and the Cape Breton are under contract, but not being rapidly pushed.

In Mexico the Mexican Central and the Mexican Nationa

NEW CONSTRUCTION AND SURVEYS, JANUARY 1 TO APRIL 1, 1889.

NAME OF ROAD.	Track laid between Jan. 1 and April 1.			Under construction.			Surveyed or under survey.		
	From.	To.	Miles.	From.	To.	Miles.	From.	To.	Miles.
Alabama Midland	Bainbridge, Ga.	Spring Creek	10	Spring Creek	Ada, Ala.	150			
Albermarle & Pantego	End of track, N C.	South	2	End of track	Haslin, N. C.	16			
Alleghany & Kinzua	Deer Lick, N. Y.	Freck's, N. Y.	5.5						
Alexandria & Arcadia							Alexandria, La.	Arcadia, La.	50
American Midland	Ottawa, Ohio.	Glendorf	2				Glendorf, Ohio.	Ft. Wayne, Ind.	86
Annapolis & Baltimore S. L.				Near Annapolis, Md.	Bay R. & Annap. R.R.	1			
Anniston & Montgomery							Anniston, Ala.	Montgomery, Ala.	110
Apopka, Clay Sp. & Gulf				Clay Springs, Fla.	Apopka, Fla	5			
Arizona Mineral Belt							Fulton, Ariz.	Globe, Ariz.	140
Astoria & South Coast				Skipanon, W. T.	South	10	End of track	Seaside House, W. T.	8
Atlantic Coast Line—									
Albemarle & Raleigh				Williamston, N. C.	Plymouth, N. C.	24			
Wilmington & Weldon	Scotland Neck, N. C.	Bethel, N. C.	24	Bethel	Greenville, N. C.	14	Greenville, N. C.	Jacksonville, N. C.	65
Atlantic & Western (Fla.)							New Smyrna, Fla.	Atlantic Ocean	3
Augusta & Chattanooga							Augusta, Ga.	Chattanooga, Tenn.	250
Augusta & Southeastern				Lone Grove, Ark.		3			
Austin & Northwestern							Burnet, Tex.	Marble Fall	17
Baltimore Belt							In Baltimore, Md.		5
Baltimore & Drum Point							Baltimore	Millersville, Md.	35
Bangor & Portland							Pen Argyle, Pa.	Wind Gap, Pa.	3
Barnegat Park							Barnegat Park Sta.	Barnegat Bay, N. J.	2
Bay of Chaleurs							Cascapedia, Que.	Paspebiac, Que.	40
Beaver Creek & Cumberland Coal	In Cumberl'd Mts., Ky		2						
Beech Creek & Hudson River							Newberry, Pa.	Shickshinny, Pa.	60
Billings, Clark's F. & Cooke C.							Billings, Mon.	Coal mine	51
Blackville, Alston & Newberry							Seivern, S. C.	Columbia River	33
Bloomsburg & Sullivan	Jamison City, Pa.	Northward	0.7						
Bowling Green & Northern							Bowling Green, Ky.	Litchfield, Ky.	40
" "							Bowling Green	Scottville, Ky.	25
Brantford, Waterloo & Lake Erie				Brantford, Ont.	Waterford, Ont.	17	Waterford	Toronto	43
Brockv., Westport & S. S. M.							Lynn, Ont.	Brockville, Ont.	5
Brookfield				Brookfield, N. Y.	NorthBrookfield, N.Y.	7			
Buff., Rochester & Pitts—									
Lincoln Park & Char							Lincoln Park, N. Y.	Charlotte, N. Y.	2
Cairo & Northwestern							Cairo, Ill	E.Cape Girardeau, Ill.	40
Canadian Pacific—									
Ontario & Quebec				London. Ont.	Windsor, Ont.	112			
Canada & St. Louis							Goshen, Ind.	Danville, Ill.	60
Battle Creek & Bay City							Midland, Mich.	Battle Creek, Mich.	92
Canastota, Morrisville & Southern							New Berlin, N. Y.	Earlville, N. Y.	23
Cape Breton				Point Tupper	North Sydney, C. B.	98			
Cape Fear & Yadkin Valley				Fayetteville, N. C.	Wilmington, N. C.	81			
Cape Girardeau South Western	Williamsville, Mo.	Hunter, Mo.	23						
Carolina, Cumberland Gap & Chic.							Edgefield, N. C.	Asheville, N. C.	200
Carson & Colorado							Keeler, Cal.	Mojave, Cal.	100
Carthage & Adirondack				Oswegatchie, N. Y.	Turtle River, N. Y.	4	Jayville, N. Y.	Little River, N. Y.	14
Castine & Bangor							Castine, Me.	Bangor, Me.	38
Central of Georgia	Columbus, Ga.	Buena Vista, Ga.	20	End of track	Buena Vista, Ga.	13			
"				Chattahoochee River	Columbia, Ala.	1.2			
Savannah & Western				Eden, Ga.	Eastward	7			
Central (New Bruns.)			10	Norton, N. B.	Chipman, N. B.	44	Chipman	Fredericton, N. B.	40
Centralia & Ste. Genevieve							Sparta, Ill.	Centralia, Ill.	45
Charleston, Cincin. & Chic.			8	Marion, N. C.	Breaks of Sandy, Ky	183			
Chattanooga Southern	Chattanooga, Tenn.	South	3				End of Track.	Alpine, Ala.	75
Chattanooga Union	Tinklers, Tenn.	Sherman Heights.	1	Oak Hill, Tenn.	East End, Tenn.	1.2			
Chesapeake & Ohio				New River	Riverview, W. Va.	2.5			
Troy & Tiptonville							Troy, Tenn.	Tiptonville	20
Chicago Burlington & Quincy—									
Burlington & Miss. River				Alliance, Neb.	Northwest	140			
Chicago, Kalamazoo & Saginaw				Hastings. Mich.	Northeast	14			
Chicago, Kansas & Arkansas							St. Joseph	Lawrence, Kans.	60
" "							Neosto, Mo.	Van Buren, Ark.	100
Chicago & New Orleans							Shumway, Ill.	Paduoah, Ky.	150
Chicago & Northwestern							Montrose, Ill.	North Evanston, Ill.	7
Chic., St. Louis, Kans. City & Galv.							Hannibal, Mo.	Springfield, Mo.	256
Cincin., Alabama & Atlantic							Huntsville, Ala.	Tullahoma, Tenn.	54
" "							Tullahoma	Somerset, Ky.	150
Cincinnati Circular							Cincinnati, O.	Idlewild Junction	7
Cincin,, Ham. & Dayton	Wyoming, O.	Lockland, O.	0.7						
Cincinnati, Wheeling & New York							Morgan, O.	Freeport, O.	50
" "							Cumberland, O.	McConnellsville, O.	
Clearfield & Jefferson	Horatio, Pa.	Coal Colliery	1						
Cleveland, St. Louis & Kansas City							Alton, Ill.	Boonville, Mo.	160
Cleveland & Wheeling				Sherrodsville, O.	Martin's Ferry, O	46			
Columbia, Newberry & Laurens							Columbia, S. C.	Spartanburg, S. C.	42
Columbus, Lima & Milwaukee							Columbus, O.	Defiance, O.	125
Columbus Southern				Columbus, Ga.	Albany, Ga.	87			
Concord—									
Suncook Valley							Pittsfield, N. H.	Alton Bay, N. H.	12
Cooperstown & Susquehanna V.							Cooperstown J., N. Y.	Davenport C., N. Y.	9
Cornwall							Mt. Hope, Pa.	Lancaster, Pa.	14
"							Lebanon, Pa.	Middletown, Pa.	25
Cornwall & Lebanon							Lebanon, Pa.	Reading, Pa.	28
Coshocton & Southern							Coshocton, O.	Zanesville, O.	30
Coudersport, Hornells. & Lack.							Coudersport, Pa.	Hornellsville, N. Y.	55
Covington Transfer				Covington, Ky.	Ludlow, Ky.	1.8			
Craig Mineral							Eagle Rock, Va.	New Castle, Va.	25
Cumberland Ry. & Coal Co.	End of track	Oxford, N. S.	3						
Cumberland Valley				Martinsburg, W. Va.	Winchester, Va	22.04			
Dallas, Pacific & S. E.				Dallas, Tex.	Northwest	15	End of track	Northwest	75
Darien Short Line							Darien, Ga.	Northeast	100
Davenport, Iowa & Dakota							Cedar County, Ia.	Big Stone Lake, Dak.	200
Dayton & Faunsdale				Dayton, Ala.	Faunsdale, Ala.	8.5			
Deer Creek & Susquehanna				Belair, Md.	Stafford, Md.	15.7			
Denison, Bonham & New Orleans				Denison, Tex.	Bonham, Tex.	20			
Denison & Washita Valley				Lehigh, Ind. Ter.	Southeast	10	Denison, Tex.	Lehigh	75
Denver & Rio Grande				Glenwood Springs	Rifle Creek, Col	26			
" "				Sapinero, Col.	Lake City, Col.	36			
Denver, Texas & Ft. W.	Forbes Junc., Col.	Cañon de Agua	5.03						
Des Moines Belt Line							Des Moines, Ia.	Highland Park	3
Dexter & Piscataquis				Dexter, Me.	Foxcroft, Me.	16.5			
Diamond Valley	Globe Run, Pa.	Gaines' Run, Pa.	1.2	Gaines' Run	Moorsville, Pa.	1.2			
Duluth, Red Wing & Southern				Red Wing, Minn.	Zumbrota, Minn	25	Red Wing, Minn.	Duluth, Minn.	155
Duluth & Winnipeg							Cloquet, Minn.	Itasca, Minn.	70
Durham & Northern	Neuse River.	Big Ledge Creek, N.C	8						
Eastern Kentucky				Willard, Ky.	Webbville, Ky.	2			
Eau Claire, Miss. & L. Superior							Eau Claire, Wis.	Winona, Wis.	66
Elgin, Pit. & Havelock							Havelock, N. B.	Kuth's Mills	2
Elkhart & Western							Elkhart, Ind.	Mishawaka, Ind.	11
Elk Mountain							Carbondale, Col.	Robinson's Lake, Col.	
Empire & Dublin				Empire, Ga.	Dublin, Ga.	20			
" "				Empire, Ga.	Hawkinsville, Ga.	12			
Etowah Valley							Gainesville, Ga.	Rome, Ga.	75
Eutauville				Santee River	Sumter, S. C.	25.			
Evansville, Ft. Wayne & Chic.							Lafayette, Ind.	Ft. Wayne, Ind.	108
Evansville Suburban & Newb.	Evansville, Ind.	Oak Hill	2	Evansville, Ind.	Newburg, Ind.	8.5			
Evans. & Terre Haute—									
Evans. & Richmond				Elnora, Ind.	Seymour, Ind.	65	Seymour	Richmond, Ind.	70
Fairhaven & Southern				Fairhaven, W. T.	Skagit River	30			
Farmville & Powhatan				Clover Hill, Va.	Farmville, Va.	64	Farmville	Hampden, Sidney Col	7
Florence Northern				Florence, Ala.	North	25	End of track	Linden, Tenn.	60
Florida Midland				Harpers, Fla.	Kissimmee, Fla	14			
Forest City & Southeastern							Forest City, D. T.	Gettysburg, D. T.	10
Forest City & Watertown							Forest City, D. T.	Bowdle, D. T.	75
Fort Plain & Richfield Springs							Fort Plain, N. Y.	Richfield Sps., N. Y.	20
Ft. Smith, Paris & Dardanelle							End of track	Arkadelphia, Ark.	75
Freehold & New York	Keyport, N. J.	Lorillard Brick W'ks.	2.5				Lorillard Brick W'ks.	Hopping, N. J.	5
Ft. Worth & Rio Grande							Granbury, Tex.	Colorado River	135
Genesis & Obed River	Genesis, Tenn.	South	2				Genesis	Sunbright	15
Georg., Caro. & North							Chester, S. C.	Atlanta, Ga.	220
Georgia Pacific	Columbus, Miss.	West	45	End of track	Baird, Miss	95	Greenville	Huntington, Miss.	18
Georgia South. & Florida				Valdosta, Ga.	Lake City, Fla.	60	Lake City, Fla.	Palatka, Fla.	98
Gettysburg & Harrisburg							Gettysburg, Pa.	Washington, D. C.	75
Grafton & Upton							West Upton, Mass.	Milford, Mass.	8
Grand Rapids & Ind.							Near U. B. Rap., Mich	Ludington, Mich.	45
Grand Trunk—									
Great Western Div.							Stony Creek.	Burlington Beach	2
" "							Chatham Sta.	Chatham, Ont.	1
Great Northern				New Glasgow, P. Q.	Montcalm, Que.	20	Lachute, Que.	St. Andrews, Que.	8
Great Western Air Line							Charlotte, N. C.	Randolph Co.	60
Gulf & Ship Island							Near Gulfport, Miss.	Hattiesburg, Miss.	50
Hartsville				Darlington, S. C.	Hartsville, S. C.	10			
Hawesville & Pellville Mineral							Hawesville, Ky.	Haynesville, Ky.	18
Hecla & Torch Lake					Red J'ck't Mine, Mich	1			
Helena, Tupelo & Decatur							Helena, Ark.	Tupelo, Miss.	145
Hermosa, Hill City & West							Hermosa, Dak.	West	30
Hoosac Tunnel & Wilmington				Readsboro, Mass.,	Tannery	1	Readsboro	Whitingham, Vt.	6
Hornellsville & West Union							Hornellsville, N. Y.	West Union, N. Y.	16
Houston Central, Ark. & Northern				Bastrop, La.	Columbia, La.	50	Pine Bluff, Ark.	Bastrop	123
" "							Columbia, La.	Alexandria, La.	

NEW CONSTRUCTION AND SURVEYS, JANUARY 1 TO APRIL 1, 1889.—Continued.

NAME OF ROAD.	Track laid between Jan. 1 and April 1.			Under construction.			Surveyed or under survey.		
	From.	To.	Miles.	From.	To.	Miles.	From.	To.	Miles.
Huntington & Guyandotte River							Guyandotte, W. Va.	Pineville, W. Va.	131
Ilwaco & Shoal Water Bay							Long Beach	Shoal Water Bay	12
Ind., Decatur & Western							Decatur, Ill.	Beardstown, Ill.	81
Interoceanic	Pueblo, Mex.	San Martin, Mex.	33.70	San Martin	Nanacamilpa	23.08			
"	Vireyas	Near Perotí	3.12	Vireyas	Perotí	29.32			
"				Tantepec	Amacusac	29.32			
"				Perotí	Vera Cruz	125.42			
Isbell & Iron Mountain							Isbell, Ala.	Brown ore beds	6
Jacksonville, Tampa & Key West—									
Jacksonville & S. W.						7.5			
Johnsonburg							Harvard Junction	Johnsonburg, Pa.	43
Jones Mountain							Hudson, N. Y.	Quarryville, N. Y.	15
Kanawha							Fairfields, W. Va.	Coal mines	10
Kanawha & Ohio—									
Charleston & Ganley							Campbell's Ck.	Walden, Va.	2
Kanona & Prattsburg	Kanona, N. Y.		2	End of track	Prattsburg, N. Y.	10			
Kansas City, Ark. & N. O.							Beebe, Ark.	Monroe, La.	200
Kansas City Circle							In Kansas C.		15
Kansas City, Lawrence & Nebraska							Lawrence, Kan.	Grand Island, Neb.	379
Kan. City, Memphis & Birmingham				Carbon Hill, Ala.	Coal Mine	3.16			
Kan. City, Rich Hill & Eldorado							Kansas City, Mo.	Eldorado, Mo.	110
Kansas City, Rich Hill & So.							Blue Springs, Mo.	Rich Hill, Mo.	70
Kansas City & Southern	End of track	Clinton, Mo.	1						
Kansas City, Texarkana & Gulf							Red River	Antimony, Ark.	50
Kansas City, Watkins & Gulf							Lake Charles, La.	Shreveport, La.	180
Kansas, Wy. & N. W.	Axtell, Kan.	Summerville, Kan.	12.2				Summerfield, Kan.	Beatrice, Neb.	36
Kentucky Midland							Frankfort, Ky.	Union Junction, Ky.	27
Kentucky Union	Clay City, Ky.	East	2	Lexington, Ky.	Jackson, Ky.	84			
Knoxville, Cumberl'd Gap & Louisv.	Knoxville, Tenn.	Clinch River	30	End of track	Cumberl'd Gap, Tenn.	63			
Knoxville Southern				Knoxville, Tenn.	Blue Ridge, Ga.	100			
Lake Erie, Essex & Detroit River				End of track	Leamington, Ont.	3			
Lake Shore				Alton Bay, N. H.	Lake Village, N. H.	17			
Laurence, Atchison & Southern							Lawrence, Kan.	Atchison, Kan.	30
Lehigh Valley				In Allentown, Pa.		2			
Long Beach & San Pedro							Long Beach, Cal.	San Pedro, Cal.	5
Long Island				Locust Valley, N. Y.	Oyster Bay, N. Y.	4			
Louisiana, Ark. & Mo.							Alexandria, La.	Little River	135
							Delhi, La.	Trippe, Ark.	
Louisiana, North & South							Gibsland, La.	Natchitoches	25
Louisville, Hardinsburg & Western							Irvington, Ky.	Fordsville, Ky.	40
Louisville & Nashville							Pineville, Ky.	Cumberland Gap	15
Birmingham Mineral	Oneonta, Ala.	Champion, Ala.	2.34	Red Gap, Ala.	Grace's Gap, Ala.	10	Abernant, Ala.	Mines	4
Louisville, New Albany & Corydon				Corydon, Ind.	King's Cave, Ind.	4			
Louisville, New Orleans & Texas				Slaughter, La.	Bayou Sara, La.	17.5	Rosedale, Miss.	Coahoma, Miss.	46
Louisville Southern				Lawrenceburg, Ky.	Lexington, Ky.	24			
Lynchburg & Durham				Rustberg, Va.	Durham, N. C.	92			
Macon & Dublin							Macon, Ga.	Dublin, Ga.	55
Manistee & Luther	Careyville, Mich.	Southeast	3.5						
Manistee & Northeastern				End of track	Traverse City, Mich.	50			
" "				Bear Creek, Mich.	East	7			
Manitoba & Northwestern							Saltcoats, N. W. T.	Northwest	50
Mason County Cent.	Shelton, W. T.	Southeast	3				End of track	Chehalis River	6
Memphis, Little Rock & Ind. Ter.							Little Rock	Hot Springs, Ark.	54
" " "							Hot Springs	Ind. Ter. line	90
Memphis, Oxford & Columbus							Memphis Tenn.	Tuscaloosa, Ala.	265
Meridian & Tuscahama							Meridian, Miss.	Tuscahama, Ala.	48
Meridian, Waterbury & Conn.	End of track	Waterbury, Conn.	.5						
Mexican Central	Salinas, Mex.		39.9		San Luis Potosi, Mex.	31			
" "				Cardenas	San Luis Potosi	162			
Mexican National Con. Co				Near Zacatecas, Mex.	Ojo Caliente, Mex.	25	Salvatierra	Guadalajara, Mex.	
" " "				Near Manzanillo	Colima, Mex.	30	Guadalajara	Colima	
" " "							Zacatecas	Moctezuma, Mex.	100
Mexican Southern							City of Mexico	Pacific Coast	500
Middleburg, Highland & L. Butler							Middleburg, Fla.	Lake Butler, Fla.	20
Middletown & Hummelstown							Middletown, Pa.	Hummelstown, Pa.	5
Milwaukee, Lake Shore & Western				Flambeau, Ind. Res.	To Hurley, Wis.	41			
Minneapolis, St. P. & Sault Ste. M.—									
Aber., Bis. & No. W.							Aberdeen, Dak.	Bismarck, Dak.	164
Minnesota & Dakota							Fargo, Dak.	Antelope Lake, Dak.	200
Minnesota Northern							Worthington, Minn.	Appleton, Minn.	100
Minnesota & Southeastern				Branch		3			
Mississippi Valley							Arkansas City, Ark.	W. Baton Rouge, La.	261
Missouri, Kansas & Texas							Lockhart	Smithville, Tex.	20
" " "							Boggy Tank	Houston, Tex.	40
" " "							Lancaster, Tex.	Hillsboro, Tex.	35
Missouri Pacific—									
St. Louis, Iron Mt. & Southern				Coffeyville, Kan.	South	25		Wagoner, I. Ter.	50
Den., Memphis & Atlantic							Chetopa, Kan.	Joplin, Mo.	35
Mobile, Jackson & Kansas City							Mobile, Ala.	Perry County, Miss.	70
Monongahela River							Fairmount, W. Va.	Clarksburg, W. Va.	35
Montana Central							Sana Coulee, Mont.	Belt Mts., Mont.	30
Monterey & Mexican Gulf	Monterey, Mex.	South	7.5	End of track	Victoria, Mex.	168	Victoria, Mex.	Tampico, Mex.	175
Napanee, Tamworth & Quebec							Tamworth, Ont.	Beyond Marlbank	10
Narragansett Pier				Nar'gansett Pier, R.I.	South Ferry, R. I.	4.5			
Norfolk & Va. Beach							Princess Anne, C. H., Va.	Elizabeth Park, Va.	25
Norfolk & Western							Tazewell, W. Va.	Norton	86
" "							Flat Top ext.	Ironton, O.	185
" "							Ivanhoe	Mt. Airy, N. C.	45
Nevada-California & Oregon				Lassen Co., 70th mile.	123d mile, Cal.	53			
New Brunswick & Prince Edward							Sackville, N. B.	Wird Point	5
New Orleans, Natchez & Ft. Scott				Natchez, Miss.	North	1.5	Vidalia, La.	Girard, La.	80
Newport, Jonesboro & Fort Scott							Newport, Ark.	Jonesboro, Ark.	37
New Westmins., Bellingh. Bay & Seattle				New Westm'r, B. C.	Whatcom, W. T.	44	Whatcom	Seattle, W. T.	90
New York, Lake E. & West.—									
Jefferson							Ararat Summit, Pa.	Honesdale, Pa.	20
N. Y., N. H. & Hartford							Farmington, Conn.	New Britain, Conn.	6
New York & Ohio							Streetsboro, O.	Greenville, Pa.	65
Norfolk & Carolina	Drivers, Va.	Southwest	3	Drivers	Chowan River, N. C.	37			
" "				Roanoke River, N. C.	Tarboro, N. C.	23.3			
" "				Chowan, N. C.	Roanoke River	27.5			
Northern Maine							Mattawamkeag, Me.	Presque Isle, Me.	116
Northern Michigan							Houghton, Mich.	Watersmeet, Mich.	78
Northern (N. H.)							Franklin, N. H.	Tilton, N. H.	5
Northern Pacific	Laurel Junc., Mont.	Red Lodge, Mont.	43.9						
Northern Pacific & Manitoba	Winnipeg, Man.	End of track.	15	End of track	Portage la P., Man.	37	Morris, Man.	Brandon, Man.	140
Ohio Valley	Henderson, Ky.	Evansville, Ind.	14.6				Princeton, Ky.	Hopkinsville, Ky.	30
Old Colony							No. Attleboro	Walpole, Mass.	12
Omaha, Dodge City & Southern							Dodge City, Kan.	Superior, Neb.	203
Oneida, Oneonta & New York							Oneida, N. Y.	Oneonta, N. Y.	75
Oneonta & Richfield Springs							Oneonta, N. Y.	Richfield Spgs., N. Y.	32
Ontonagon & Brute River				Rockland, Mich.	Hill C'k Siding, Mich.	26.1			
Orange Belt				Monroe, Fla.	Sanford, Fla.	4			
Oregon Ry. & Nav. Co.—									
Pleasant V. Branch	East W. T.	End of track	18.5	Tekoa, W. T.	Mullan, Id.	87	Seltice, W. T.	Winona, W. T.	36
Oregon & Washington Territory							Walla Walla, W. T.	Whitstone H'w, W.T.	45
Orlando & Winter Park							Winter Park, Fla.	Lake Jessup, Fla.	15
Owensboro, Falls of Rough & Green River							Owensboro, Ky.	Litchfield, Ky.	45
Oxford & New Glasgow				Oxford Junction, N.S.	Brown's Point, N. S.	72.3			
Pacific Short Line—									
Nebraska & Western							Sioux City, Ia.	West	100
Paris, Choctaw & Little Rock							Paris, Tex.	Red River	30
Pensacola & Memphis							Pensacola, Fla.	Northwestward	65
Pennsylvania—									
Ohio Connecting				Nimick, Pa.	Wood Run, Pa.	2.2			
Turtle Creek Valley				Moss Side, Pa.	Murrysville, Pa.	6.29	Murraysville	Saltsburg, Pa.	16
Penn., Pough. & Boston	Pine Island, N. Y.	Augusta, N. J.	18	Augusta, N. J.	Slatington, Pa.	59.5			
Hudson Connecting	Campbell Hall, N. Y.	Northeast	19	End of track	Poughkeepsie, N. Y.	10			
Pough & Boston							Poughkeepsie, N. Y.	Silvernail, N. Y.	27
Spring. & Conn.							Simsbury, Conn.	Springfield, Mass.	19
Peoria Terminal							In Peoria, Ill.		3
Pet., Sebastopol & Russian River							Petaluma, Cal.	Russian River, Cal.	40
Phila. & Reading—									
Atlantic City	Jefferson, N. J.	Mullica Hill, N. J.	1.5				Mt. Ephraim, N. J.	Spring Mills, N. J.	8
Pittsburgh, Shen. & Lake Erie							Osgood, Pa.	Conneaut, Pa.	50
Pontiac, Pacific Junction							Black River	Pembroke, Ont.	15
Port Clinton Short Line							Port Clinton, Ohio	Fremont, O.	20
Portland & Rochester							In Portland, Me.		1
Portland & Willamette Valley							Oswego, Ore.	Oregon City, Ore.	7
Port Townsend South				Port Townsend, W. T.	South	6	Port Townsend		70
Raritan River							Washington, N. J.	New Brunswick, N. J.	13
Red River, Sabine & Western							Nacagdoches, Tex.	San Augustine, Tex.	35
Richmond & Danville—									
High Pt., Rand. & So.				High Point, N. C.	Asheboro, N. C.	26			
Western N. Caro.	Jarrett, N. C.	Valley Town, N. C.	7	Valley Town	Murphy, N. C.	23			
Northwestern N. Caro.				Bethania, N. C.	Wilkesborough, N. C.	60			
Richmond, Fredericksb. & Potomac								Richmond, Va.	8

NEW CONSTRUCTION AND SURVEYS, JANUARY 1 TO APRIL 1, 1889.—Continued.

NAME OF ROAD.	Track laid between Jan. 1 and April 1.			Under construction.			Surveyed or under survey.		
	From.	To.	Miles.	From.	To.	Miles.	From.	To.	Miles.
Rich., Nich., Irwine & Beattyville				Nicholasville, Ky.	Richmond, Ky.	21.1	Versailles, Ky.	Nicholasville	16
" " " "							Richmond, Ky.	Beattyville	64
Roanoke & Southern	Winston, N. C.	Walnut Cove, N. C.	18	Walnut Cove, N. C.	Martinsville, Va.	43	Martinsville	Roanoke, Va.	55
Rochester & Glen Haven				Glen Haven, N. Y.	Irondequoit Bay	1.5			
Rockaway Valley							N. Germantown, N. J.	Potterville, N. J.	6
Rockland, Rockport & Camden							Rockland, Me.	Camden, Me.	9
Rome & Carthage							Rome, N. Y.	Carthage N. Y.	70
Rome & Decatur							Attala, Ala.	Decatur, Ala.	75
St. Augustine & South Beach				Mantanzas River	Sea Shore	3		Mantanzas Inlet	15
St. Cloud Sugar Belt				Runnymeade, Fla.	Narcoossee, Fla.	3			
St. Ignace & Sault Ste. Marie							St. Ignace, Mich.	S'lt Ste. Marie, Mich.	53
St. John & Eastern							St. John, N. B.	Elgin, N. B.	40
St. Lawrence Southern							Gouverneur, N. Y.	Fine, N. Y.	25
St. Paul, Alexand., L. Arthur & G.							Alexandria, La.	Vermillion Bay, La.	150
St. Paul, Black Hills & Pacific							Mandan, Dak.	Rapid City, Dak.	306
St. Paul, Min. & Man							Fosston, Minn.	To main line	150
St. Paul, New Ulm & Southw.							Hopkins, Minn.	Lakefield, Minn.	125
Salt Lake, Nevada & California							Salt Lake City	Wyoming line	86
San Antonio & Aransas Pass	End of track	Houston, Tex.	15	Guadaluyse River	Llano, Tex.	70			
" " " "				Shiner, Tex.	Gonzales, Tex.	20			
San Bernardino Cent.									
San Diego, Cuy. & East	San Diego, Cal.	Lakeside, Cal.	22						
San Francisco & North. Pacific	Hopland, Cal.	Ukiah, Cal.	14				Lakeside, Ca.	Salton, Cal.	110
San Gabriel Valley									
Santa Ana, Fairview & Pacific							Los Angeles, Cal.	Eastward	6
Savannah, Americus & Montgomery				Abbeville, Ga.	McRae, Ga.	25	Fairview, Cal.	Newport Ldg., Cal.	5
Schuylkill & Lehigh Valley							Louvale, Ala.	Montgomery	100
Scioto Valley				Portsmouth, O.	Sciotoville, O.	5.4	Schuylkill County	Lehigh Valley R. R.	60
Scranton & Forest City							Scranton, Pa.	Forest City, Pa.	20
Seattle, Lake Shore & Eastern				Falls City Sta., W. T.	East	10			
Selma & Cahaba Valley							Selma, Ala.	Bessemer, Ala.	97
Silver Springs, Ocala & Gulf							Gulf Junction, Fla.	North Bridgers, Fla.	15
" " "							Ocala, Fla.	Palatka, Fla.	47
" " "							Bridgers, Fla.	Pinnelos, Fla.	83
Silverton							Ironton, Col.	Ouray, Col.	12
"							Silverton, Col.	Eureka, Col.	10
Spokane Falls & North							Spokane Falls, W. T.	Columbia River	80
Somerset				Embeden, Me.	Carrutunk Falls	3	Currutunk Falls	Bingham, Me.	8
Sonora, Sinaloa & Chihuahua							Guaymas, Mex.	Topolobampo B., Mex	220
South Atlantic & Ohio			1.5			3	Clinch River	Big Stone Gap, Va.	
South Bethlehem & Utica							Memphis Sta., N. Y.	Utica, N. Y.	70
Southern Pacific	End of track	Santa Margarita	3.95	Victoria, Tex.	Beeville, Tex.	55			
" "				Newman, Cal.	Tulare, Cal.	110			
Springfield & Claremont							Gassets, Vt.	Claremont, N. H.	12
Spring., Shelbyville & Mt. Carmel							Springfield	Effingham, Ill.	84
Springfield & Southern							Springfield, Ill.	Murphysboro, Ill.	140
State Line & Oakland							Oakland, Md.	Confluence, Pa.	45
Staten Island Rapid Transit				Arthur Kill Bridge	Roselle, N. J.	5			
Stockton, Fresno & Southern							Stockton, Cal.	Visalia, Cal.	175
Suffolk & Carolina							Terminus	Edenton, N. C.	10
Suwannee River							Suwannee River, Fla.	Southeast	16
Tavares, Apopka & Gulf							Watt's Junction, Fla.	Oakland, Fla.	5
Tacoma, Olympia & Chehalis Valley				Centralia, W. T.	West	10	Centralia, W. T.	Gray's Harbor	80
Tennessee Central							Jewett, Tenn.	Crossville, Tenn.	17
Tennessee & Coosa							Littleton, Ala.	Huntsville, Ala.	65
Tennessee Midland	Huron, Tenn.	Decatur County	25				Tennessee River	Nashville	95
Tennessee & Ohio							Rogersville, Tenn.	Big Stone Gap, Va.	55
Temiscouata				Edmunston, N. B.	St. Francis River	36			
Tiffin & Fremont							Marble Head, Ohio.	Upper Sandusky, O.	65
Tilton & Belmont				Belmont, N. H.	Tilton, N. H.	4.1			
Tobique Valley				Perth, N. B.	Trout Lake, N. B.	14	Trout Lake	Plaster Rock, N. B.	14
Toledo, Ann Arbor & N. Michigan	Springville, Mich.	Northeast	10		Glen Arbor, Mich.	52			75
Toledo, Columbus & Southern							South Findlay, Ohio.	Columbus, Ohio	74
Tucson, Globe & Northern							End of track	Globe, Ariz.	60
Union Pacific—									
Utah Central							Milford, Utah	Nevada line	100
Union Point & White Plains				Union Point, Ga.	White Plains, Ga.	13			
Utah & Arizona							Chester, Utah	Manti, Utah	17
Utica, Adirondack & Saratoga							Prospect, N. Y.	Noblesboro, N. Y.	20
Vancouver, Klickitat & Yakima				Near Vancouver, W. T.	East	5			
Vincennes, Oak & Owensboro							Vincennes, Ind.	Owensboro, Ky.	70
Warrier Coal Fields							Meridian, Miss.	Gainesville, Ala.	57
Waynesboro, Pascagoula & Gulf C.							Waynesboro, Miss.	Scranton, Miss.	107
Western Counties							Digby, N. S.	Annapolis, N. S.	17
Western Md.	Fairfield, Pa.	Tomis Creek, Pa.	2	Tomis Creek	Claremont	5			
Baltimore & Harrisburg	Blue Ridge Summit	Claremont, Md.	2.2						
West Side Connecting							Bayonne, N. J.	Jersey City, N. J.	5
West Va. Central	Parsons, W. Va.	Haddix Run	7	Raddix Summit	Elkins, W. Va.	15	Elkins	Southwest	70
Wheeling & Lake Erie							Bowerstown, O.	Martin's Ferry, Ohio.	43
Wheeling, Wellsburg & State Line							Wheeling, W. Va.	Pittsburgh, Pa.	65
Williamsport & Binghamton				Williamsport, Pa.	Dushore Summit, Pa.	48	Dushore, Pa.	Apalachin, N. Y.	58
Williamsville, Greenville & N. E.	Manning, Mo.	End of track	1.5				End of track	Greenville, Mo.	5
" "							Greenville	Miss. River	30
Wilmington, Onslow & E. Carolina							Wilmington, N. C.	Jacksonville, N. C.	45
Winona & Southwestern							{ Bear Creek, Minn. / { Osage, Ia.	Mason City, Ia. / Livermore, Ia	116
Wisconsin Midland							Fond du Lac, Wis.	Florence, Wis.	156
" "							Hustisford, Wis.	Fond du Lac	43
" "							Kaukauna, Wis.	Sturgeon Bay, Wis.	72
" "							Fond du Lac	Madison, Wis.	69
Zealand Valley							Zealand Notch, Me.	Thomson's Falls	3
Total miles			585.04			4,221.23			16179.78

have considerable work under way, and work on several new lines has been begun. The Inter-Oceanic and the Monterey & Mexican Gulf, are among those on which some construction may be expected.

Compound Locomotives.

At the last meeting of the New England Railroad Club, April 10, the discussion on Compound Locomotives was opened by a paper by Mr. Angus Sinclair, of which an abstract follows. Mr. Sinclair said, in substance:

Compound loccmotives have been working successfully on European railroads for upwards of twelve years, yet practically nothing has been done on this continent to demonstrate the value of this system of steam using, an apathetic condition that may be attributed partly to two causes: 1st, the antipathy which American locomotive designers have always displayed to any change of form likely to increase complication of parts; 2d, to the fact that no heavy pressure has ever been put upon our railroad mechanical officers to effect rigid economy in the use of fuel. Although the desirability of using fuel economically has been discussed a great deal among us of late years, on many roads enginemen still act as if the coal placed on tenders was as cheap as the water passed into the tanks.

When compounding of marine engines became a generally recognized success the principle soon made progress into stationary engine practice. Locomotive designers next took up the idea of expanding the steam in more than one cylinder, and within the last ten years about 600 compound locomotives have been built and are now at work. If the opposition to compounding marine engines was stormy, the antagonism to applying the principle to locomotives has been cyclonic.

The fundamental purpose of all intelligent improvers of the steam engine is, to convert an increased proportion of the heat energy in the steam that passes from the boiler into the mechanical energy that drives machinery and performs other kinds of work. An axiomatic principle recognized by all engineers versed in thermo-dynamics is, "The higher the temperature of the steam when it enters the steam cylinder, and the lower that which it reaches before the exhaust occurs, the greater will be the efficiency of the engine, if the reduction of temperature has been caused by the conversion of heat into useful work." The engine that will best perform this function of transforming the energy of heat into work will in the end prove the most efficient machine.

Locomotive improvers have clung very ardently to a certain sound principle in steam engineering, and generation after generation since the time of Stephenson have moved in cycles, working on the problem of getting the steam quickly into the cylinders at near boiler pressure, cutting it off at the shortest possible point consistent with the work to be done, and expending it as low as practicable before opening the exhaust. Owing to the defects of the valve motion used on locomotives and other causes, steam is seldom cut off earlier than quarter stroke, which permits an approximation to four volumes of expansion. This is not pronounced enough to develop the evils of cylinder condensation in an aggravated form. But suppose by the use of an improved motion it is made practicable to admit steam for only four inches of a 24-in. stroke. The expansion then will be six volumes, and it will be found beyond the line of economical expansion in simple locomotives. Suppose the steam is admitted at 160 lbs. absolute pressure, or a little over 145 lbs. gauge pressure, and expanded to six times the original volume. The exhaust pressure will be about 26 lbs. The temperature of the steam on admission would be 363 deg. F. and at release it would be 242 deg., making a variation in the temperature of over 120 deg. The metal of the cylinder tends to adjust itself to the temperature of the steam giving or taking heat during the recurring events of the strokes. The cool exhaust steam has imparted its temperature to the cylinder, and when the hot steam from the boiler passes through the ports at the beginning of next stroke, it goes into a comparatively cool cylinder, the metal of which absorbs heat till it is raised to the temperature of the steam. Saturated steam is constantly on the dew point, and on the least portion of the heat of vaporization being abstracted, a corresponding quantity of the steam falls into water just as it does inside of a condenser. When the steam becomes water in the cylinder, it loses its power to do mechanical work, therefore the percentage of steam that condenses through the interaction of the cylinder metal represents so much loss of power. A portion of the steam condensed becomes spray, and helps to dampen the steam filling the cylinder. When the steam is cut off and expansion proceeds, part of the heat is converted into mechanical work, and a proportional amount of condensation takes place. By the time the release point is reached the pressure of steam has become low and the relief of tension inclines the water to flash back into steam, and it draws on the metal of the cylinder for heat which acts as fuel to turn the condensed water into steam. This happens during the period of release and return, when that end of the cylinder is open to the atmosphere, so the re-vaporization of the water represents unmitigated loss of heat.

The serious losses that occur in the steam engine through cylinder condensation and re-vaporization are well known, and have been as clearly proven as anything belonging to steam engineering, yet few railroad men act as if they properly realized the importance of the matter. There are probably few locomotives that lose less than 20 per cent. of the steam used through cylinder condensation. Locomotive cylinders are more exposed to refrigerating influences than the cylinders of any other form of engine; yet very little attention is bestowed upon furnishing them with the best protection that care and ingenuity might devise.

In the compound engine the losses due to excessive cylinder condensation are prevented by avoiding extremes of temperature. The steam of 160 lbs. absolute pressure and 363 deg. temperature would be cut off in the high pressure cylinder at about ⅙ stroke to obtain six volumes of expansion and passed into a receiver at a pressure of 53 lbs. and temperature of 285 degrees. The difference in temperature between the initial and the terminal pressures in the low pressure cylinder would be even less pronounced. Any re-vaporization of water that follows condensation in the high pressure cylinder does not cause much loss in a compound engine, for the regenerated steam passes into the receiver and is utilized to perform work in the low pressure cylinder instead of escaping uselessly into the atmosphere as it does from the cylinder of a simple engine. These are the causes that make expansion of steam in the successive cylinders of a compound engine more economical than the same ratio of expansion carried out in a single cylinder.

As early as 1850 Mr. John Nicholson, an engine driver on the Great Eastern Railroad, designed a compound locomotive, and several were built and used for a few years. He had a high pressure cylinder on one side and a low pressure cylinder on the other, live steam being used in both cylinders for starting. The cylinder ratio was 1 to 2. The proportions were as good as anything produced by later designers.

To a French engineer belongs the credit of originating the movement that has made the application of compounding to locomotives a success. Mr. Anatole Mallet became con-

vinced that the locomotive could be materially improved by compounding, and he advocated the change so convincingly that in 1876 the Bayonne & Biarritz Railway Co. had two compound locomotives built according to the designs of Mr. Mallet. The engines were in a great measure experimental, but they proved a decided success, and the general design was as good as anything subsequently brought out.

The Mallet system with a few modifications was adopted by Mr. Von Borries, Mechanical Superintendent of the Hanover Railroad; by Mr. T. W. Worsdell, Locomotive Superintendent of the Great Eastern Railway of England and many other mechanical heads of railroad companies, so that under different names there are more compounds of the Mallet design at work than all the other types of compound locomotives combined. The leading features of the engine are a single high pressure and single low pressure cylinder connected to cranks set at right angles, the ratio of cylinders being about 1 to 2. Slide valves are used which cut off steam in either cylinder at the points found most desirable for economical working. A receiver intervenes of about the capacity of the high pressure cylinder between high and low pressure cylinders. The engine is very little more complex than a simple locomotive.

Two years after the first compound locomotives built according to the Mallet plans were put into service, Mr. F. W. Webb, Locomotive Superintendent of the London & Northwestern Railway, converted an old locomotive into a compound on the same general design. This engine was kept at work regularly for three years, and a close record of her performance convinced Mr. Webb that the compound principle was worthy of a more extended trial. There is a great antipathy among English engineers to the use of side rods in high speed locomotives, and Mr. Webb conceived the idea of utilizing the compound principle in such a way that the necessity of coupling rods would be obviated. This conception was reduced to practice by designing a three cylinder compound locomotive consisting of two high pressure cylinders placed outside the frames and connecting with the back pair of driving wheels, and a single low pressure cylinder placed under the smoke-box and transmitting power to the front pair of driving wheels through the medium of a cranked axle. After considerable changes were effected suggested by experience with successive engines of this general design, the inventor has settled upon the style of engine lately purchased by the Pennsylvania Railroad Co., and spoken of by the designer as being of the "Dreadnaught" class. This locomotive has three cylinders of 24-in. stroke. The high-pressure cylinders are each 14 in. diam. and the low pressure cylinder is 30 in. dia. The ratio of high-pressure cylinder to low pressure cylinder is 1 to 2.3. According to marine engine practice, the measure of a compound engine's capacity is the size of the low pressure cylinder. This applies to compound locomotives only after the engines have got into running speed. When working in this way the Pennsylvania compound locomotive has a cylinder capacity equivalent to that of a simple engine with cylinders 21.21 × 24 in. For starting a train from rest, however, the engine has a power equal only to the capacity of the two 14 × 24 high pressure cylinders.

As the principal object in applying the compound principle to locomotives has been to effect saving of fuel, special attention has been devoted to the compiling of correct records of the relative cost of service performed by simple and compound locomotives. One cannot examine the returns sent in from the mechanical superintendents of railways in nearly all quarters of the globe, without being convinced that compounds work more economically than simple locomotives; but it is exceedingly difficult to estimate a fair average of the measure of saving. The reports make it vary from 10 to 25 per cent. of saving in the quantity of fuel used. Probably 15 per cent. of saving might be a fair average.

Compounding in itself does not bring about all this saving, as a considerable share of the economy must be attributed to the higher pressures of steam used; but a conspicuous merit of the system of compounding is that it provides the means of taking more of the potential work out of high-pressure steam than can be utilized with a simple engine where the facilities for expansive working are so limited.

There are other incidental advantages in the manner steam is used in a compound locomotive, which, no doubt, contribute to swell the saving of fuel. The prevention of condensation and re-evaporation of steam through avoiding extremes of cylinder temperature, has been already alluded to. When the steam is worked through two cylinders, there is considerably greater pressure on the pistons when the cranks are near the quarter than with a single cylinder using steam expansively; hence there must be superior rotative effort. The average unbalanced pressure on valves and pistons is also less on a compound than on a simple engine, so that leakage of steam will be diminished. As a compound engine uses 15 or 20 per cent. less steam than a simple engine to do the same work, the boiler has not to be urged so hard to evaporate water; consequently a larger exhaust opening can be used, and as that means a slower velocity of fuel gases, there will be fewer sparks drawn through the flues.

On the other hand a compound locomotive is more expensive to build than a simple one. If a boiler has to be built capable of carrying a working pressure of nearly 200 pounds, the original cost and the expense of repairs will be increased. The additional mechanism of a compound locomotive must increase the expense of maintenance, and the risk of failure or delay through breakage or the parts getting out of order is greater.

The ordinary American locomotive could be converted into a compound with very little expense or structural change. The Mallet system could be applied by changing one cylinder, and the extension smoke-box would be a highly convenient receptacle for the steam receiver. Although the design of the American locomotive would enable our master mechanics to compound their engines at very little expense, the present system of operating the train service would make a compound locomotive of any existing type unsuitable for doing the work. Economy of fuel in operating locomotives is held to be of much less importance than that of having an engine which will pull the last car possible out of a yard or over a grade. To comply with this demand, our locomotives are built to exert every pound of traction that the adhesion on the driving-wheels makes possible. Our stations and stopping places are so numerous that, unless a locomotive is capable of exerting her full power the moment the throttle is opened, she will lose time on passenger trains, delay traffic with freight trains, and soon become a reproach and a nuisance.

There has been no compound locomotive built that is capable of meeting the existing conditions of American train service. The most successful compounds are very powerful engines when working the steam expansively, but they are incapable of exerting in starting a train, or during a slow pull, the full tractive force that the adhesion admits of. The Pennsylvania Webb compound, with its 14 × 24 high pressure cylinders, and 30 × 24 low pressure cylinder, exerts a starting force only equal to the power developed in the small cylinders. When the train is once moving, and the low pressure cylinder is exerting its power, the engine can do rather more work than a simple engine with cylinders 21¼ × 24 cutting off at three quarter stroke, which provides a high maximum power at the time it is not urgently needed. In the Mallet system it is usual to admit live steam to the low pressure cylinder in starting, and shut it off automatically when the wheels have turned a revolution. This, in practice, would be equivalent to pulling back the reverse lever of a simple engine to the 12 in. notch the moment a single revolution of the wheels had been made. It is unnecessary to dwell on the inconveniences that such an arrangement would cause with our method of handling trains.

If compound locomotives are ever to be used successfully in this country they will have to be designed specially to meet the requirements of our train service. Mr. A. N. Towne, General Manager of the Southern Pacific, lately made a statement to the effect that coal for the company's locomotives costs them $6 a ton in San Francisco, and that they have to haul it in some cases thousands of miles to the divisions where the fuel is used. The enormous saving that would result to the Southern Pacific Co. and other roads from a reduction of 15 per cent. of the coal consumed will some day bring about a fair trial of compound locomotives in this country. When that time comes an important element of success will be due to the engineer who designs a compound locomotive with simple, efficient and durable appliances for transforming the engine into direct acting or compound acting at the will of the man in charge. American inventive genius ought to be equal to supplying this demand.

The PRESIDENT read a letter from Mr. T. N. Ely, General Superintendent of Motive Power, Pennsylvania Railroad, transmitting a statement of the dimensions of the compound locomotive "Pennsylvania" recently imported from England for that road, also a photograph of the locomotive. The latter was hung on the wall for the inspection of the members of the club.

Mr. LAUDER: I think the gentleman who has just favored us with a paper on the subject of compound locomotives has struck the keynote when he states that it will be impossible to adapt the compound principles to locomotives under the existing conditions of train service in this country. While there is no doubt that the compound principle could be adapted to locomotives, giving the engine such trains as it could handle, there would be a large saving in fuel. In other words there would be a decreased amount of steam used to perform a given amount of work. But in this country the question of fuel has been of secondary importance, the first consideration being to get a locomotive to do the work required. I believe the railroads of this country could be more economically worked, and as satisfactorily, if every engine could be rated, and its load stated in cars or tons, according to the grades of the road, and at no time a greater load put on to an engine than its rating indicated for it. In that way I think the compound engine could be successfully used in this country, and with economy. In European countries the engine hauls a much lighter load than with us. Here there is a continual demand for more powerful engines, something better and stronger than anything we have got. We can't go much further in that direction. I believe the limit of weight of engines has already been exceeded, especially with our fast trains, for the best service, and that in the future we shall come to have lighter engines and correspondingly lighter loads. The result of an accident to a train weighing 500 tons going at a speed of 50 or 60 miles an hour, is something fearful to imagine and vastly worse than with a train weighing only 100 tons. Until we lighten our trains and our engines, I don't think the compound principle can be successfully applied.

Mr. CONEY: I have been very much gratified in listening to Mr. Sinclair's paper, especially the closing sentence, in which he says that the ingenuity of American engineers will eventually produce the kind of locomotive that we need, of the compound style. The consumption of fuel is a matter of great importance to railroads, especially where the coal fields are at a distance. In Massachusetts, a saving of 15 per cent. (?) in the cost of fuel would mean a dividend of one per cent. to the road. When we see the vast improvements made in stationery and marine engines, it is fair to presume the locomotive will be equally improved, both as regards economy in the use of fuel as well as in other ways, and that the compound locomotive will supersede our present engine for railroad uses. The man who invents such an engine will be a shining star amongst us.

Mr. Sinclair, during the discussion, stated that he knew of engines which had shown an efficiency of one horse-power for two pounds of coal per hour as the result of actual experiments. Professor Lanza called for the records of experiments, and was informed by Mr. Sinclair that they were performed by Mr. Stroudly on an English railroad. At the suggestion of Professor Lanza the President called upon Mr. D. L. Barnes to speak upon the subject of compound locomotives, and to give an account of his recent trip on the locomotive "Pennsylvania" on the mountain grades west of Altoona.

Mr. BARNES: It is true I have been riding upon the new English compound locomotive "Pennsylvania," and am very much pleased with her performance and appearance. She is now being broken in for accurate trials on the New York Division. And in order to prepare her for a maximum performance she has been put on the heavy grades west of Altoona. This engine is placed ahead of two other engines, making a triple header, which hauls the fast mail train to the west.

This locomotive is fitted with a throttle lever like a crank on the back of the boiler head, and two reversing devices, one, a screw, for the high pressure cylinder, the other, a lever, for the low pressure cylinder. In starting, the reverse lever of the low pressure cylinder is placed in full gear position, the reversing screw for the high pressure cylinder being also in full gear. Steam at 175 lbs. pressure is admitted to the high pressure cylinder. This slips the high pressure drivers and the high pressure cylinder exhausts into the low pressure cylinder, and its power, as well as the power of the high pressure cylinder, is thus available for starting trains. Owing to the fact that the low pressure crank may sometimes happen to be on the dead centre the full power of the engine might not be available for starting, but any difficulty in this respect is obviated by making it one of the duties of the engineer to be always informed of the position of this crank, and when he has an unusually difficult train to start he either backs up or moves ahead slightly before slipping the hind drivers to fill the large cylinder. In extreme cases where this cannot be readily done the engineer, before he is prepared to start, uses a pinch bar and pinches the main drivers off the dead centre. This is seldom necessary in English practice. The pressure in the low pressure cylinder, as I have observed it, while the engine is starting varies from 40 to 50 lbs. The whole weight of the locomotives of the type of the "Pennsylvania," as well as the power of both cylinders, is available for starting trains from a standstill whenever needed, and when under way, even at extremely low speeds, the full power of both cylinders is always available.

When operated upon heavy grades, where the demand for steam was greatest, this type of engine seemed to burn the fuel with little or no smoke under conditions in which the average American engine, and even the excellent engines of the P. R. R. emit considerable smoke. The exhaust takes place only half as often as on our engines, there being twice the interval between blasts, the fire burning beautifully. The exhaust is 4.75 in. in diam.

In the trip up the grades west of Altoona, the compound locomotive was exerting its full power, and emitted little or no smoke, while the two Pennsylvania engines emitted large volumes of black smoke. This absence of smoke in case of compound engines is the result of a combination of several features, some of which could be applied to American locomotives, others of which it would not be advantageous to consider with a view of adoption under our operating conditions. The large grate surface in proportion to the weight on the driver, the great economy of the engine in the use of steam, the fire-door deflector, which deflects air upon the fire and burns the smoke, the thin brass tubes and the thin copper fire-box are some of the features of this engine which assist in the reduction of the smoke. The P. R. R. Co. has been considering building a compound engine for some time past, and has purchased this compound with the broad-minded intention of educating its mechanical department in the actual performance of a compound locomotive before taking the step of building such locomotives for themselves. In order to demonstrate the actual advantages of compounding, if there be any, and I believe there are, they are now designing at Altoona a locomotive to compete with the compound, and to be used with a pressure of 175 lbs. This locomotive is to have the advantages of the good workmanship and the excellent designs proverbial in Pennsylvania practice.

I have been listening with much interest to the paper upon compound locomotives, and while it gives an accurate review of what has been done in the past in compounding, and states clearly and correctly the results of economy shown by these locomotives in actual service, and also calls our attention to the necessity for American designers to modify the designs in order to make them applicable to American railroads, yet I cannot quite agree that the almost sole advantage of compound locomotives results from a reduction of cylinder condensation. Regarding this matter, the best English authorities—the English have had more experience in compound engines than any other nation—dispute with each other that there is any great gain resulting from a decrease of cylinder condensation, but all admit that there is surely some gain.

The greatest advantage, and one which I see was not referred to in the paper, is that resulting from the increase of steam pressure which invariably follows the adoption of compound locomotives. It was found in the case of marine engines that there was no advantage either in the triple or the quadruple expansion engines unless with each additional cylinder there was an increase in steam pressure. Mr. Sinclair refers to the cause of the non-success of early attempts at compounding on English railroads as being the result of a lack of progressive spirit on the part of the non-mechanical officers of the road. I think this lack of success is better explained by calling attention to the fact that in those days the steam pressures used were so low as to render compounding or double expansion useless. Mr. Robertson has given us some information regarding the compound locomotive with four cylinders, placed tandem, which was built by a Mr. Dunbar, and used to some extent on the Boston & Albany Railroad. I have known of this locomotive for several years past, but have been unable to obtain any information regarding it. Its lack of success was not due either to the design, which I understand was excellent, or to the narrow-mindedness of the officers, but to the low steam pressure used. In using cylinders giving quadruple expansion, it has been found necessary to carry the steam pressure up to nearly 200 lbs. in order to obtain a considerable a vantage as a result of construction over the use of the triple expansion.

There is another statement made in the paper which puts the compound engine in a wrong light, it seems to me, before this meeting. It has impressed Mr. Lauder with the feeling that the compound locomotives are necessarily of less capacity than our present type of locomotives, and that there is something inherent in the construction of such engines which will prevent them from starting and hauling trains as large as these now common in America. Mr. Lauder is familiar with the heavy passenger car service, and is using a pressure of 170 lbs. per sq. in. on his locomotive, and, therefore, one can imagine that he would readily realize the difficulties in the way of adoption of a type of locomotives necessarily having less power than those now in use in America. But this is a wrong impression. While the compound engine, referred to in the paper, is of limited power, yet it is not because such engines cannot be made more powerful, but it is because that the work for which those engines are designed is lighter and less demanding than that required by locomotives in America; and, further, while it may be stated that the compound engine referred to is not a powerful engine, yet such a statement is not true of all compounds now built, or in fact of a majority of them. There are, as stated by Mr. Lapage in a paper before the Institution of Mechanical Engineers in London, about 360 engines now at work which at the moment of the opening of the throttle, and always afterwards, have available a full power of both cylinders and the adhesion resulting from the drivers available for hauling train, and operate precisely in the same manner as American locomotives, all driving wheels being coupled together. This type of locomotive is known as the Worsdell & Vonborries type. Among these engines there are consolidations, moguls and other types familiar in America. They are in use in Europe on the Saxony state railroads as well as others, where they start heavy goods trains satisfactorily and haul them up heavy grades.

I notice that Mr. Sinclair in his remarks leaves an impression, as shown by Mr. Lauder, that the compound locomotives are necessarily more complicated and more expensive to keep in repair, besides requiring greater attention on the part of the engineer. While this may be true of some classes of compounds it is not true of all. There are compound engines in large numbers running in South America, Australia, Africa, India and on the continent, which differ from the ordinary engines only in the fact that they have one cylinder considerably larger than the other, with a connection between them. There is only one throttle lever to handle and only one reverse lever to manipulate, one valve motion to keep in repair and two cylinders and two valves to maintain. In order to change the American locomotives or the common form of foreign locomotives to a compound engine working with all the advantages of economy as shown by actual trial which results from a double expansion, it has only been found necessary to remove the cylinders now in use and substitute one smaller and one larger one, into which steam is admitted and regulated by valves of the ordinary design and construction, the exhaust of the small cylinder being directly connected to the steam chest of the larger cylinder by an ordinary steam pipe passing through the smoke-box; the Stephenson link motion of the ordinary type being changed only by lengthening one link hanger, or by altering the angle of one of the horizontal arms of the reverse shaft in order to make the low-pressure cylinder cut off a little later in the stroke than the high-pressure cylinder. In addition to that it is desirable to place what is known as an "automatic intercepting valve" which automatically admits, in a simple way, steam at reduced pressure into the low pressure cylinder directly from the boiler without requiring any attention on the part of the engineer. This intercepting

valve is automatically closed by the exhaust from the high pressure cylinder as soon as the exhaust from the high pressure cylinder has filled the intervening steam pipe. It, therefore, seems a little unfair to the double compound principle to state that its adoption necessitates the use of locomotives having a minimum power at starting. I am not prejudiced in favor of compound locomotives, but having given this matter some attention I do not feel justified in allowing this point to pass unnoticed, and permitting a wrong impression to prevail.

Mr. Sinclair took exception to the statement made by Mr. Barnes, and stated that he thought that Mr. Barnes did not understand the construction of the intercepting valve which allowed steam to enter the low pressure cylinder. He stated that such intercepting valve closed immediately as soon as the high pressure cylinder exhausted, and thereby reduced the locomotive to a compound with minimum hauling power before the train was under way.

In reply to this Mr. Barnes called attention to the fact that the intercepting valve was so constructed that it did not close or shut off the admission of live steam direct from the boiler into the low pressure cylinder until the pressure of the exhaust from the high pressure cylinder into the low pressure cylinder was quite equal to the pressure of the steam being admitted from the boiler into the low pressure cylinder, and further showed that when the high pressure cylinder was working at nearly full stroke, as at starting, the exhaust from it was at a pressure sufficiently high to give to the low pressure cylinder a power equal to or greater than the power of the high pressure cylinder, and that the two combined had in general more power to rotate the wheels than it was customary to allot to engines of the ordinary type working in single expansion. In order to substantiate the statements he quoted from the London *Engineering*, of 1888, (April 13, p. 361, card 5) where it is shown that the compound locomotive at starting has a mean effective pressure in the high pressure cylinder of 100 lbs. and in the low pressure cylinder of 53 lbs. The large cylinder being about twice the area of the low pressure cylinder, it will be seen that the powers of each are almost exactly equal.

The PRESIDENT: I will read some extracts from letters from Mr. F. W. Webb, the Locomotive Superintendent of the London & Northwestern, and the designer of the compound locomotive now being tried on the Pennsylvania. Under date of Dec. 24, 1886, he writes: "The compound locomotive is capable of taking 20 carriages at express speed. The sister engine to the 'Marchioness of Stafford' on her first trip to London took a load equal to 14.5 of our six-wheeled carriages to Rugby, 75.5 miles, thence to London with 16 carriages, 82.5 miles; total distance, 158 miles; coal per mile, 269 lbs.; time occupied, 3 hours, 19 minutes; (average per hour, 47.64 miles).

"The weight of the 'Marchioness of Stafford' is 42 tons, 10 cwt.; weight on high and low pressure driving wheels, 15 tons each."

Jan. 31, 1889, he writes: "We have at the present time running on the London & Northwestern Railway 70 compounds, doing fast passenger work; 30 of them with 6 ft. 6 in. wheels, 13 in. outside cylinders, and one 26 in inside, and 40 of them with 14 in. outside and one 30 in. inside cylinder. Also two compounds on suburban work, and two on some of our heavy gradient branches doing passenger work. Besides there are 16 compounds built on my system on other railways, which are doing well and saving considerably in fuel. In one case we have had a compound converted from a non-compound engine, and during the last four years this engine has been doing identically the same work as one of the same class of non-compound from which it has been converted, thus enabling one to form a fair comparison of the two systems The compound has worked during this period on 23.2 lbs. per mile, against an average of 31 lbs. per mile for the non-compound.

"On the L. & N. W. line up to Nov. 30 last we have run 10,396,382 miles with this type of engine. The 30 smaller ones working our Irish mails and other fast traffic between London & Hollyhead, have run 5,960,830 miles, with an average consumption of 30.2 lbs. of coal per mile."

The distance from London to Hollyhead is 263.75 miles, and the fast trains make the run in six hours, including several stops; average per hour 43.96 miles—passengers from America landing at Queenstown, thence to Dublin, thence by steamer to Hollyhead, thence by rail to London, saving several hours, and rapid transit is called for.

"The 40 large ones doing our main line work between London and Carlisle have run 4,133,613 miles, with an average consumption of 36.6 lbs. coal per mile. From the mileage we have run with the number of engines, you will see from the fact that they have averaged over 42,225 miles per annum that they have not been nursed; and in some cases the engines are double gauged, running from Crewe to London and back every day except Sunday, a distance of 316 miles per day."

Under date of Feb. 1, 1889, the agent for the Worsdell & Von Borries system writing from London, says: "We have about 300 compounds running and under construction. Comparative trials have shown an economy of fuel consumption in favor of compounds of from 15 to 20 per cent."

Mr. LAUDER: If we have got to use compound engines in order to secure economy of fuel we have got to run lighter trains, and, consequently, more trains to do the same amount of work we are doing now, and we might in saving $10 a day in fuel spend $100 in other directions. There are many expenses connected with the running of trains besides that of fuel, such as salaries of officers and men, tools, baggage cars, signal lights; additional engines would also be required; all these things are to be considered. I believe we now transport passengers and freight cheaper than anywhere else on earth a certain number of miles, notwithstanding we have to pay at least twice as much for our labor.

Mr. WEBBER: With regard to the rating of engines, out west the engines are rated; every engine belonging to the Chicago division of the western roads has its rating, taking into consideration the maximum grade where it is to run, and that rating is based on the utmost the engine will do without starting the flues leaking so the fires will go out before it gets back; and they carry that to an extraordinary extent. The trains starting from Aurora eastward go up a grade of about 80 feet, and when hauling corn are helped out of the yard by one or two pushers. Until those conditions are materially changed, I don't see but the compound locomotive will have to wait. In regard to economy of fuel, that question is of more importance in some sections than others, for instance in lower California and perhaps here in New England, while in the west coal is much cheaper, the highest price paid by the C. B & Q being $1.25 per ton, and there are many lines where coal is delivered by the side of the track. I think the first solution of the problem of greater economy, is in the increase in the square feet of grate surface rather than in the cylinder.

Mr. BARNES: I do not know of any reason why I should assume that a compound engine should not have sufficient power to start the train it is to haul. An engine built on the Von Borries plan should have just as much power in starting a train as any engine in America, and there are consolidation engines, mogul engines, compounds, in Europe, in the Saxony States particularly, which start heavy trains satisfactorily and haul them up heavy grades.

The "Security" Portable Stop Block.

On motion of Mr. Lauder, it was voted that the thanks of the club be tendered to Mr. Theodore N. Ely for the beautiful photograph of the compound locomotive in use on the Pennsylvania.

The "Security" Portable Stop Block.

We illustrate herewith a stop block manufactured by Mr. Wm. G. Robinson, of New York. It is intended for locking cars on sidings and elsewhere, and can also be used as an adjunct of a wrecking car to fasten guy ropes to, on any part of the track; and to block trucks in the repair shops. The apparatus is very simple. The bosses on either side have each two inclined faces, placed symmetrically, and the form of the faces of the discs at the ends of the hand lever is such that as the lever is turned down the clamps are forced together. The lever is locked in place as shown in the cut. The stop block being symmetrical the lever can be turned either way without removing the clamps from the rail.

This stop block is made of steel and weighs about 20 lbs.

A Complication of Tracks.

A correspondent has sent us a diagram showing a very complicated arrangement (or disarrangement) of tracks which has come about by the process of accretion uncontrolled by foresight. These tracks are at Sharpsville, Pa. It will be seen that there are within a length of about 230 ft., on the tracks in question, 10 frogs, of which four are double pointed. The diagram illustrates a condition (not uncommon in that region) in which a railroad, in forcing its way to a connection with a furnace or rolling-mill makes necessary a confusion of crossings and switches which is an eye-sore to a trackman, and, as is any make-shift, a thing to be deprecated. In the case in hand, the Sharpsville Railroad was, originally, the sole purveyor of stock to the Florence and Claire furnaces. By way of the switch at *A* it operated tracks 1, 2, 3 and 4. By the switch at *B* it reached the stock-trestle (track 5), and by a switch now removed it reached Claire stock-house by way of track 6, as also by track 8. It had (and still has) a track in to Sharpsville furnace.

Then came the Sharon Railway, desiring to reach Florence and Claire, as well as the Sharpsville furnace; and the furnace people desired the new connection. The furnaces are so situated, and the topography of the neighborhood is such, that the attainment of the desired end was hardly feasible, except by means of the "layout" shown in the drawing. Hence this particular arrangement is excusable; the more so as by means of the Sharon Railway tracks the Lake Shore trains now, also, reach the three furnaces above named.

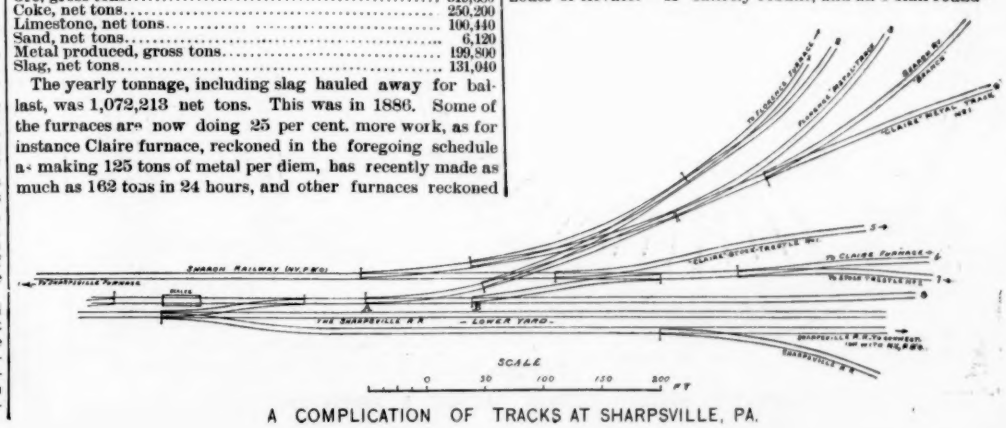
Our correspondent gives the following information of the iron industry of the little town of Sharpsville. These figures were compiled in 1886:

There are at that point six furnace companies operating nine stacks, the largest having a capacity of 160 tons per diem, the others about 100 tons each. Two of these stacks (Perkins & Co.) are reached by the Erie & Pittsburg (Ph. R. R.) Railroad only. To all others the N. Y., P. & O. (Erie), the L. S. & M. S. and the Sharpsville Railroad (by which road the B. & O. sends coke to Sharpsville via the Pittsburgh & Western) have access. The Erie & Pittsburgh has direct access to three plants only. The estimated capital invested in furnace plant was $944,500. With six stacks in blast the tonnage of material used and produced was as follows per annum:

Ore, gross tons	319,680
Coke, net tons	250,200
Limestone, net tons	100,440
Sand, net tons	6,120
Metal produced, gross tons	199,800
Slag, net tons	131,040

The yearly tonnage, including slag hauled away for ballast, was 1,072,213 net tons. This was in 1886. Some of the furnaces are now doing 25 per cent. more work, as for instance Claire furnace, reckoned in the foregoing schedule as making 125 tons of metal per diem, has recently made as much as 162 tons in 24 hours, and other furnaces reckoned above at 80 tons per diem now make nearer 100 tons per 24 hours. There are at the present moment five furnaces in blast making not less than 530 tons (of 2,268 lbs.) per diem, or more than 95 per cent. of the product of the six furnaces as operated in 1886.

The superior block coal, mined on the line of the Sharpsville Railroad, formerly used raw in the furnaces, is now, as fuel in iron making, displaced by coke. The coal now goes West, mostly to Chicago.



A COMPLICATION OF TRACKS AT SHARPSVILLE, PA.

Improvements on the New York Central & Hudson River.

Many extensive and costly improvements and betterments are now under way and projected for this season on the New York Central. We can give but a brief note of them at this time, but hope to describe some of them in detail in later issues.

Beginning in New York City, the pier and freight shed at pier 37, North River, are to be entirely rebuilt, and a new brick freight warehouse will be built at the Thirtieth street station. A new coaling trestle will be put in on the west side also, by which the present expensive process of raising the coal by stationary engines will be done away with. The magnificent retaining wall above Sixtieth street is about completed, and illustrations and description of it will be given later.

At the Grand Central station a transfer table, to be driven by an electric motor, will be put in to handle heavy cars. This will probably be much the same as the Altoona transfer table lately shown very fully in the *Railroad Gazette*. An electric plant will be put in to furnish power for the table and also to light the entire station and the yards.

At Mott Haven the work of establishing the great car storage yard, for which land was lately acquired, is going on. The new yards will have capacity to store 14 miles of cars. One set of tracks will be devoted to Wagner cars. Each of these tracks will be long enough to take a train, and platforms will be built between them, each alternating platform being roofed over so that the bedding, cushions, etc., can be taken out, aired and overhauled. There will also be round-houses, small shops and coaling trestles built at this yard.

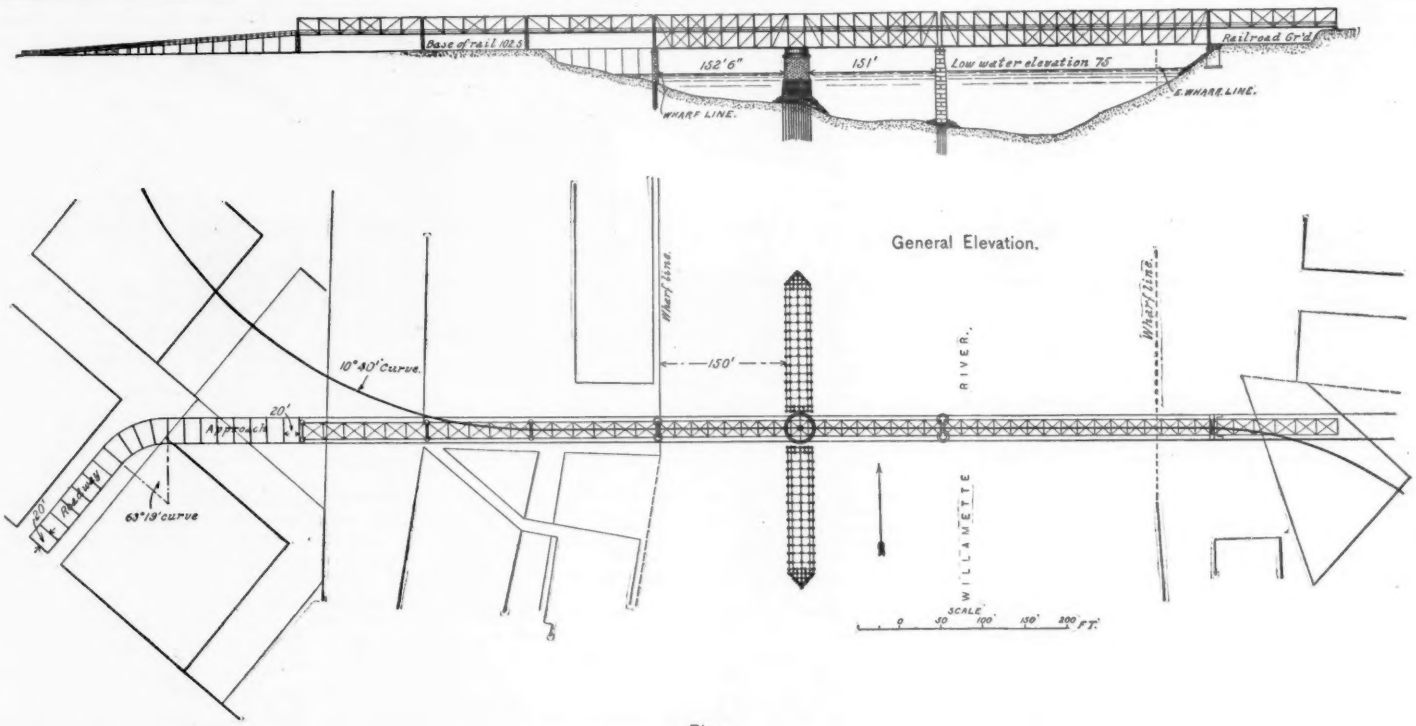
About 40 per cent. of the "Harlem depression" is now done, and some $580,000 has been spent on the work. This work covers about five miles.

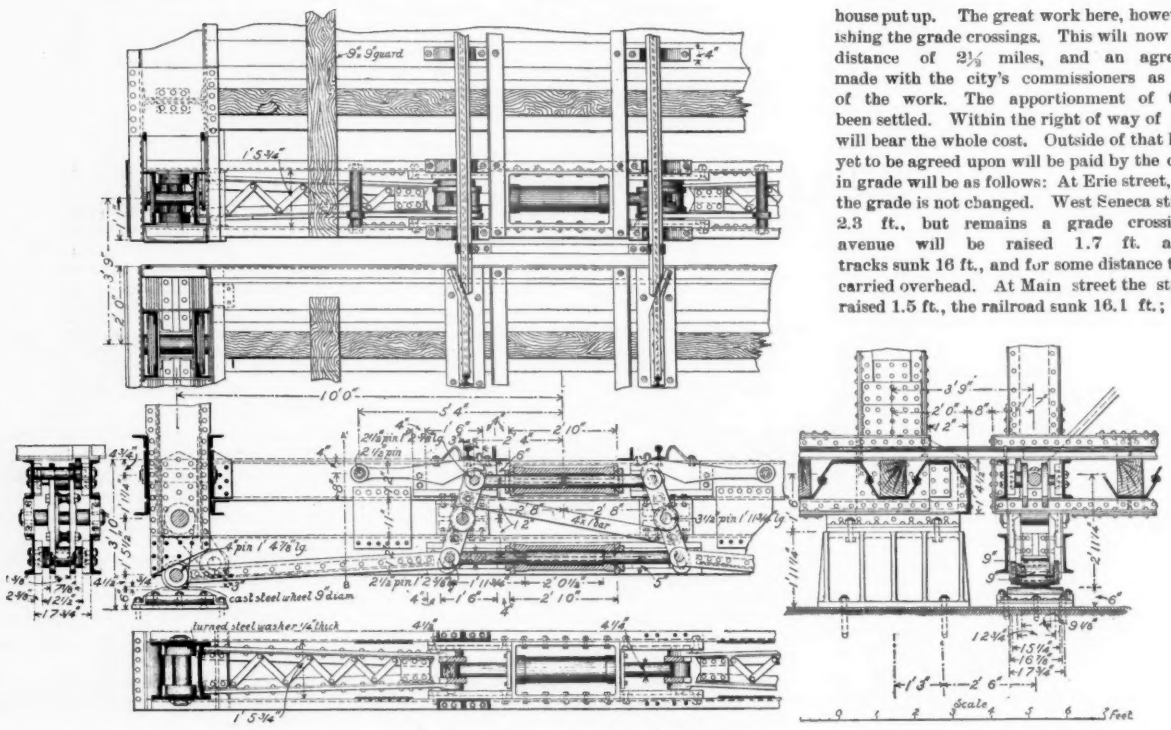
From Mott Haven Junction to Spuyten Duyvel Junction the 65-lb. rail is being replaced with the standard 80-lb. and the Davies spike.

At Riverdale, Irvington and Dobbs Ferry handsome stations are to be built at a cost of $35,000. They are to be of red granite and Longmeadow red sandstone, of the same general character as some of those recently built by the Boston & Albany.

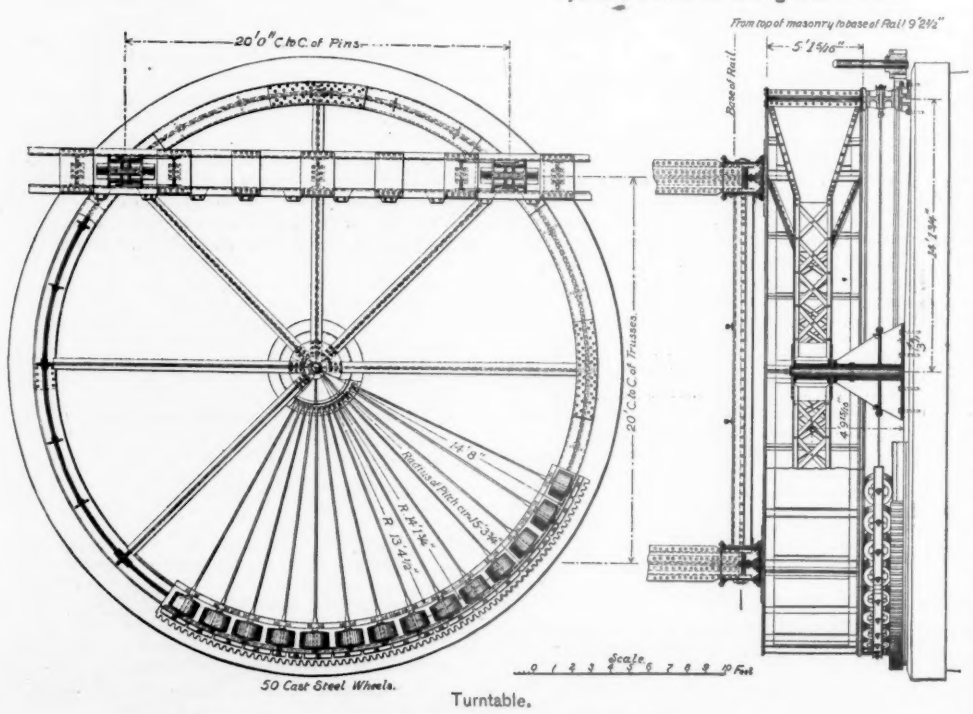
At Albany great improvements are to be made in the passenger station. The waiting rooms will be enlarged and toilet rooms entirely overhauled. New platforms will be built also. At Lyons a brick station, 25 × 115 ft., is to be built. At Rochester a new brick flour warehouse, 40 × 180 ft., is to be built, and an addition will be made to the Kent street freight house. Here also the passenger station will be improved at a cost of $30,000. At Lockport, a very handsome passenger station, to cost $33,000, will be built.

The work at Buffalo is, however, the most important of all. Here the dock front is to be repaired and the boiler house of elevator "A" entirely rebuilt, and an 8-stall round-





Hydraulic Device for Lifting End of Draw.



Turntable.

WILLAMETTE BRIDGE, OREGON RAILWAY & NAVIGATION CO.

house put up. The great work here, however, is that of abolishing the grade crossings. This will now be taken up for a distance of 2½ miles, and an agreement has been made with the city's commissioners as to the character of the work. The apportionment of the cost has not been settled. Within the right of way of the railroads they will bear the whole cost. Outside of that limit a percentage yet to be agreed upon will be paid by the city. The changes in grade will be as follows: At Erie street, the starting point, the grade is not changed. West Seneca street will be sunk 2.3 ft., but remains a grade crossing. Commercial avenue will be raised 1.7 ft. and the railroad tracks sunk 16 ft., and for some distance the streets will be carried overhead. At Main street the street grade will be raised 1.5 ft., the railroad sunk 16.1 ft.; Washington street to be raised 6.2 ft., tracks sunk 11.5 ft.; Michigan street (the first east of the passenger station), raised 15.1 ft., tracks sunk 2.5 ft.; Chicago street, raised 15.9 ft., tracks sunk 1.8 ft.; Louisiana street, raised 15.2 ft., tracks sunk 2.5 ft. At Exchange street the crossing will be at grade, but the grade will be 5.3 ft. higher than at present. From this point on the tracks are above the streets. The changes are: Seneca street, sunk 7.8 ft., tracks raised 6.6 ft.; Swan street, sunk 9.1 ft., tracks raised 5.3 ft.; Emslie street, sunk 13 ft., tracks raised 1.4 ft.; Clinton street, sunk 14.4 ft., tracks not changed. Two other streets are crossed in the same way to Williams street, where the present project ends.

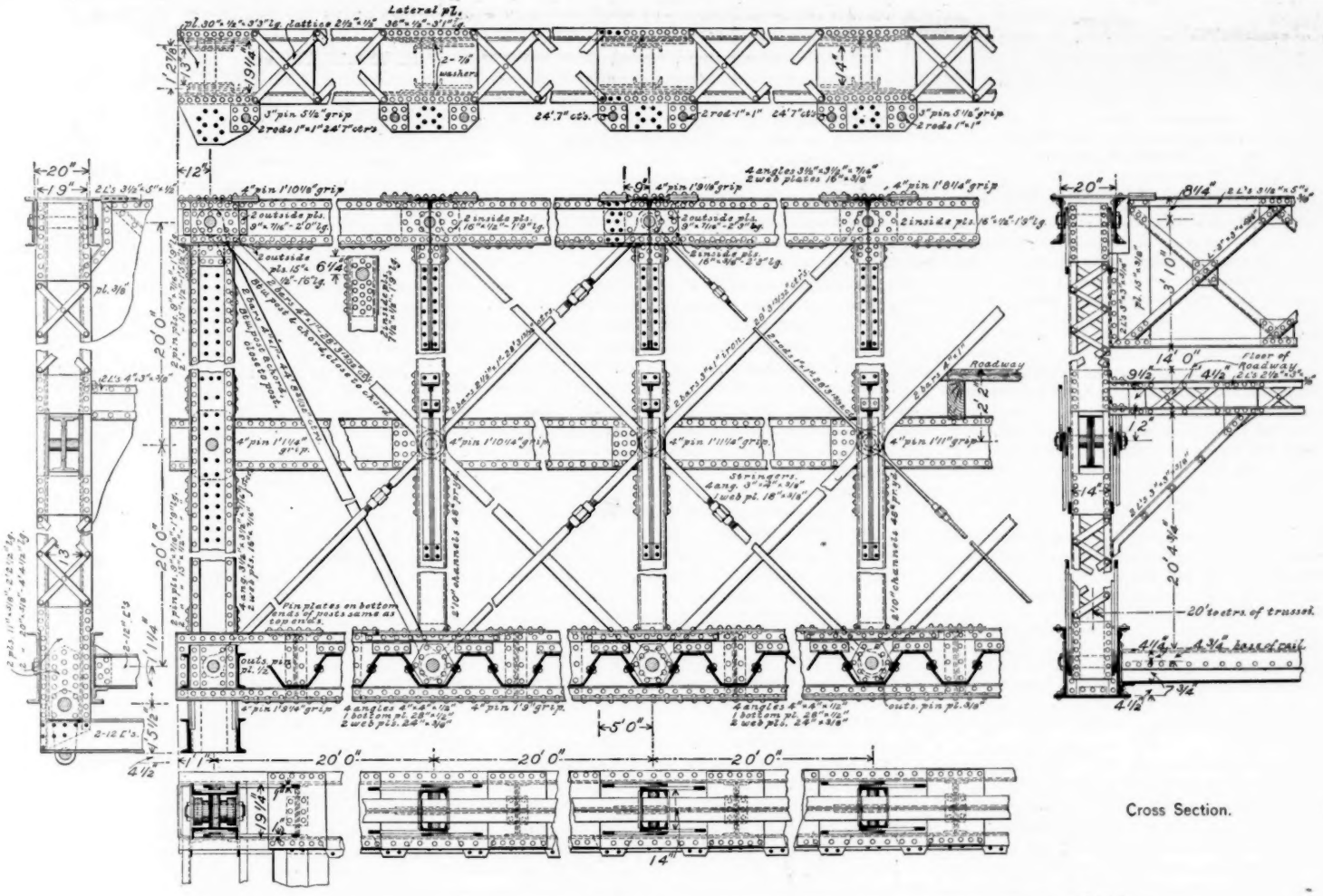
This, as we have said, is the greatest improvement of all those mentioned, not in cost alone, but in the good results to flow from it.

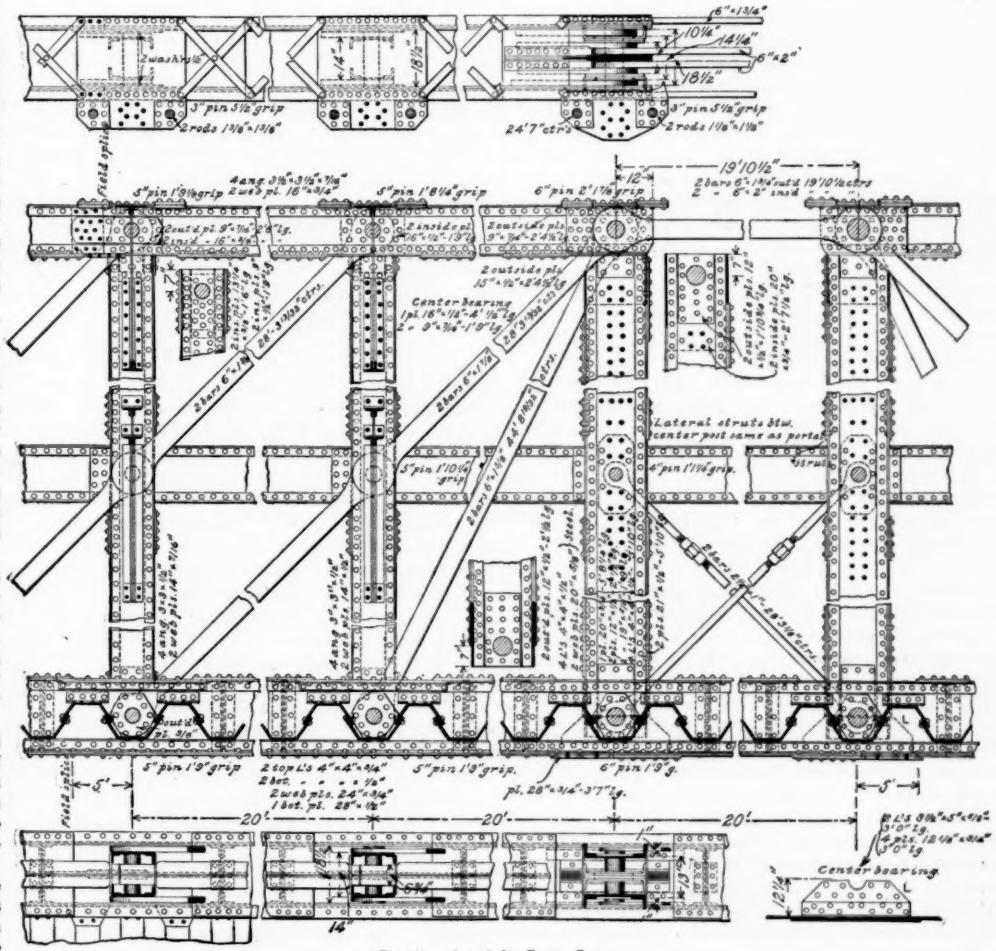
The Willamette Bridge.

The bridge of the Oregon Railway & Navigation Co. over the Willamette River at Portland, Oregon, of which illustrations appear in this issue, has some novel features which were determined by the exigencies of its location. The floor is of corrugated plates and the base of the rail is brought within 30 in. of high water.

The location selected is opposite the upper or south end of the grounds belonging to the Northern Pacific Terminal Co., and intended for the Portland station. The established street grades in this neighborhood are only a few inches above high water. In order to utilize the grounds it was necessary to cross the street at grade, and this involved putting the bridge as near as possible to high water. The character of the river is such that it was considered entirely judicious to use the small head room indicated, and even to allow the turn-table of the draw to be submerged.

The Willamette is a tributary of the Columbia, and this





Details of 340-ft. Draw Span.

WILLAMETTE BRIDGE, OREGON RAILWAY & NAVIGATION CO.

bridge is about 8 miles above the confluence of the two rivers. The highest water usually occurs in June and is due to high water in the Columbia. The extreme range between high and low water is 28 ft. A flood frequently occurs in winter or early in the spring, which comes out of the Willamette, and these floods have been known to rise 20 ft. above low water, but this is a rare occurrence. These Willamette floods are of course accompanied by a considerable current, but during the highest stages, which are due to backwater from the Columbia, there is either no current whatsoever, or a very slight current up-stream. No drift runs excepting in the floods coming from the Willamette. It was these facts of no current and no running drift during the highest stages that warranted locating the bridge so low.

The corrugated floor reduces the depth from the base of the rail to the lowest part of the bridge to a minimum, the ties being placed in the channels of the plates. Moreover, the plates and the stiff chords make a horizontal plate girder the whole length of the bridge, giving great stiffness to resist any shock from floating material. As a still further precaution, the fixed span at the east side of the river is anchored rigidly to the abutment, which is founded on cemented gravel. It is also fastened rigidly to the pier at the west end. The expansion and contraction, much less at Portland than in the more easterly parts of the country, are taken up by the spring of the pier.

The foundations are of piles, which were obtained at small expense, of a length and straightness never seen in the eastern parts of the country. The pivot pier is built on a grillage resting on piles cut off below water, in the usual way. The other principal pier consists of two iron cylinders each 14 ft. in diameter, filled with concrete and supported by piles (19 to each cylinder) which extend up into the concrete, but are cut off below low water.

The superstructure is designed to carry a single railroad track on the bottom chord and a highway in the middle of the truss. The design of the draw-span is very fully shown in the illustrations. It is 340 ft. long and 40 ft. deep between centres of pins. The main fixed span is 320 ft. long and also 40 ft. deep. The details of its design are so similar to those of the draw-span that it is not illustrated.

Besides the floor system the only novel feature about the bridge is the latching apparatus of the draw. The draw is turned by steam, the machinery for this purpose having been built and erected by the Vulcan Iron Works, of Chicago. The turntable is of the usual rim-bearing pattern, the tread being of rolled steel and the wheels of cast steel. The ends of the draw are lifted, after closing, by cams similar to those used on many other bridges, but worked by hydraulic pressure instead of the customary toggle-joint and screw. There are two horizontal presses, one of which is used to lift the ends and the other to release them. They are worked by a Worthington pump, placed at the centre. The diameter of hydraulic piston is 4¼ in. and stroke 12 in. The water pressure is 1,000 lbs. per square inch. The time required to lift and release the ends of the draw is inappreciable. The entire draw, weighing 600 tons, can be released and turned in less than one minute—a very important consideration on a river where navigation is as frequent as on the Willamette, the bridge sometimes being opened four times in an hour. The turntable and hydraulic apparatus are quite fully illustrated in the engravings.

All the principal structural parts of the draw and the main span are of steel. The corrugated floor system is of English basic steel, this pattern not being at present obtainable in America. The roadway approach spans are of wrought iron.

The Chief Engineer of this bridge is Mr. George S. Morison. The superstructure for the long spans was manufactured by the Union Bridge Co., and that for the approach spans by Mr. Lassig, of Chicago. The pile and timber work was done by the firm of Hoffman & Bates, of Portland. The masonry was laid, the cylinder piers set up and the superstructure erected by the company's own men working under the direction of Mr. Geo. A. Lederle, Resident Engineer.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

From an examination of the numerous rail sections that we have published in the last year, and from the discussions on rails, two things are tolerably evident: One is that the average weight of rail is increasing materially, and more rapidly than it has increased in recent years. The other is that the engineers and the rail makers who favor making these heavier sections with comparatively thin, broad and flat heads, are increasing in numbers. To be sure it is easy to draw wrong conclusions, for those who favor changes are those most likely to be heard from. For reasons often stated in these columns, we think the late sections, with a smaller percentage of the metal in the head, and with a long crown radius, are likely to give better wear than those designed on the theory that the metal should be piled on top to resist abrasion; but the question is one so complicated that many mistakes in theory are sure to be made. The experiment of the C., B. & Q. with the two sections shown last week, designed on radically opposite theories, made from the same metal and subjected to identical service and conditions, is therefore a very important one. There is danger that the head may be made too broad and thin and fail by splitting. Evidently the *ideal* rail cannot be made from one piece of metal, and after all we may come to a composite rail. The great first cost alone will prevent the serious consideration of this solution for a long time on most roads, but some very practical and enlightened engineers think that it is the true one.

In another column we give an account of the discussion at the New England Railroad Club on the subject of compound locomotives. We desire to call attention to this discussion, as in it are indicated some of the features of compound locomotives not generally understood. The prevailing impression seems to be that such locomotives are necessarily complicated and unless one pays particular attention to the details of their construction the impression is liable to continue. While it will be a long time before compound locomotives will be in extensive use in the United States, the time is not far distant when they will receive considerable attention and extended trials on our railroads. The demand for decreased operating expenses is becoming too strong, particularly the demand made for a more economical use of fuel (as pointed out in an editorial last week) to permit the discouragement of any promising innovation which indicates the possibility of a reduction of fuel consumption. The saving which is claimed for the double expansion locomotives in Europe, 15 or 20 per cent., is sufficient when applied to the coal bills of some of our western roads to pay a dividend of one per cent.; and it is not likely that such a promised saving, offered with so little radical change as that resulting from the introduction of double expansion engines, will be allowed to pass without notice. It would be well to remember that there is no inherent evil in the compound locomotive which would render it objectionable in American railroad service. Any representation that it cannot start heavy trains or propel them up steep grades is wholly without foundation. Some of the most powerful locomotives on the face of the earth are compound engines working on the heavy grades in the mountains of the Eastern Continent.

The New York Central has resolved to make an important reduction in its Sunday freight train service, and has been joined in the move by its two great western allies, the Lake Shore and the Michigan Central, and by the Boston & Albany. These roads have notified all connecting lines that on and after Sunday, April 28, they will not offer for interchange at any junction point any freight, live stock and perishable alone excepted, from 6 a. m. Sunday to 6 a. m. Monday, nor will they be prepared to accept any from their connections during the same hours. This is considerably more radical than the recent action of the Pennsylvania, as the latter included in the list of articles that would continue to be moved on Sunday, "high class freight." This term covers a good deal besides perishable goods and live stock, and may mean much or little. The action of the New York Central will make a very great change in the freight yard work, and doubtless in many cases result in a practical cessation of the noise, as well as the relief from duty of all the switching crews, during daylight hours; and the officers estimate a reduction of 75 per cent. in the number of freight trains on the road on Sunday. The demand, of employés' associations for relief from Sunday work show no signs of abatement, so that howsoever easy it may be to get men to work on Sunday, it no doubt remains true that the great majority desire to take their rest when other people do. Utterances like the recent forcible address of President H. B. Ledyard, at Detroit, and others of the kind, have become common enough to show that the exigencies of competition constitute the main reason for most of the Sunday work now done, and that many influential officers are ready to meet all demands of a reasonable public sentiment for a quiet Sabbath. As the noise from whistles and from the banging of 30 ton cars in switching, added to the encouragement of lawlessness among the floating population of towns and cities by the presence of scores of men at work around stations and yards on Sunday, have afforded abundant justification for these demands, it is gratifying to chronicle so marked a change as that here proposed. There appears no important reason why all the trunk lines cannot, if they choose, agree upon a suspension of unnecessary work on Sunday as well as upon freight rates or ticket fares or speed of passenger trains.

Railroad Building in 1889.

We give on another page a table showing as accurately as may be the progress of railroad building for the first three months of the year. The information there summarized has appeared from week to week in our news columns, as it was received, and has been available for all readers of the *Railroad Gazette*. Those columns furnish the fullest and most accurate current record that is to be had of the inception and progress of railroad enterprise, but by no means all of the projects which have been mentioned there find a place in the table now published for the reason that in the nature of things the construction of many of them must be for a long time doubtful.

In the table are given the mileage of main line or branch line track laid from Jan. 1 to April 1 of this year, mileage now under construction and mileage surveyed. It will be seen that the track laid is 474 miles in the United States alone and 585 miles in the United States, Canada and Mexico. At the same date last year the track laid in the United States was about 1,000 miles. Were the same ratio to be kept up this year the total new track for the year would amount to about 3,500 miles against nearly 7,000 laid last year. There is, however, no certainty whatever that such a proportion will be maintained. It may be much more and it may be less. The fallacy of any reasoning from this basis is illustrated by the experience of the *Railway Age* last year. In April, 1888, that journal ascertained that the new track for the first quarter was as much as had been laid in the corresponding quarter of 1887, one of the greatest railroad years, and at once proceeded to the conclusion that the new construction of 1888 would "amount to from 8,000 to 12,000 miles." The actual figures, as made up at the end of the year, proved to be, by the *Railroad Gazette*, 6,900 miles, and by other journals 7,100 and 6,400 miles. The difference between the impression which the estimate was calculated to carry and the facts shows the worthlessness of the basis.

In our table 4,221 miles are reported as under construction, and 16,180 miles as surveyed. The column headed "under construction" includes as a rule only lines on which contractors are actually at work. In some instances, no doubt, lines have been reported under construction when contracts have been let for but part of the distance. In all cases, however, we think lines so reported have advanced to such a point that there is a fair prospect that they will be carried to completion. How many of these lines will be completed this year no man can safely predict. Work on some of them will very probably be stopped for want of money; and other projects which do not appear in this report will come forward and be carried through. From such figures it is impossible to say anything very definite of the prospects for railroad building. Had statistics been collected for a series of years in which lines "under construction" had been carefully and accurately classified an estimate not entirely misleading might be made. But no such statistics exist. A close estimate can now only be made by examination of the policy and the financial condition of each of the roads projected or building.

In the light of these facts, the figures which the *Railway Age* gave out last week to the Associated Press, and which appear in its latest issue, are simply amusing. It is there announced that the total mileage of railroad "under construction and projected in the first three months of 1889" was 53,436 miles, and that there were 14,818 miles "under construction or contract." It is stated as a "surprising fact developed by these figures" that the "work of railway construction or inception has been going on in the name of 666 companies, representing a contemplated mileage of over 53,400 miles." Similar surprising facts can be unearthed any day by the curious. The records of the state-houses would reveal charters for railroads enough to cover the face of our country like a musquito net; and "the work of railway inception" still goes on, in attics, in corner groceries and in "bankers'" offices from Halifax to Tombstone. In fact the *Age's* figures have about as much value as an estimate of the probable number of meteors that may be seen within a given zone of the heavens next November, and they appear to have been pretty generally taken at their true worth.

The first and most obvious inference from the table which we give is that the new construction of 1889 is likely to be smaller than it has been in any year since 1885, when it was but 3,600 miles. We have pointed out some of the reasons why such an inference can be but little better than a guess. There are several facts which go to confirm it. It will be noticed that none of the great companies which made important additions to their mileage last year appear this year as probable builders. It is known that several of them are under an explicit pledge not to construct any new line this year, and the rest have little disposition to do so. Where these considerations would not act to restrict competitive building, the determination of many of the most influential capitalists and bankers to protect existing interests comes in as a powerful restraining element. It has lately become difficult for one company to raise money to build into the territory of another. Were an investment in new roads much more attractive than it is now this condition would probably not last long; but for the present it is an important factor in the situation. But for roads not closely competitive, and which, therefore, do not come within the scope of the territorial rule, it is for many obvious reasons difficult to raise money. People are getting more and more wary of putting money into properties liable to constant pillage by law-makers without and officers within, and more and more keen to detect the schemes of irresponsible promoters. On the whole, therefore, we look for a year of very moderate railroad building. It is a disagreeable fact to contemplate, but the dose must be taken, and probably everybody will be better for the physic.

But a very moderate percentage of new construction now means a good many miles. In the 11 years from 1878 to 1888 inclusive the new road built each year averaged 6.4 per cent. of the total mileage at the beginning of that year. The lowest percentage was in 1885, 3 per cent., and the highest was in 1882, 11.2 per cent. Three per cent. of the mileage at the beginning of 1889 would be about 4,700 miles; 6.4 per cent. would be over 10,000 miles.

There are yet a few facts of interest to be drawn from the table. It will be seen that again the Southern states east of the Mississippi lead the rest of the country in track actually laid, having put down almost 50 per cent. of the total so far. The same states laid 37 per cent. of all in the first four months of 1888. No other great geographical group of states has laid any

considerable proportion of the new track, it being pretty uniformly distributed. It will be seen further that but two companies have laid over 40 miles of track each. The 585 miles were built by 56 companies, giving an average of 10.5 miles each.

The road under construction is distributed as follows: Southern states east of the Mississippi, 37 per cent.; northern states east of the Mississippi not including Wisconsin, 13 per cent.; southwestern states including Kansas and Colorado, 6 per cent.; northwest, 5 per cent.; Pacific Coast, 8 per cent.; Canada and Mexico, 30 per cent.

Short-sighted Legislation.

The opinion of the Inter-state Commerce Commission in the case of the Little Rock & Memphis Railroad against the East Tennessee, Virginia & Georgia shows a contrast between American and English law which is by no means to our advantage.

The case involves the right of a company to demand the establishment of a through route, with through rates and through tickets. In the transportation of passengers from points east of the Mississippi to points in Western Arkansas and in Texas, the Little Rock & Memphis forms an intermediate link between the East Tennessee, Virginia & Georgia and the St. Louis, Iron Mountain & Southern. About a year ago the last-named company built a branch running nearly parallel to the Little Rock & Memphis, and only a few miles longer. It then gave notice to the East Tennessee, Virginia & Georgia that it would no longer honor tickets issued via the Little Rock & Memphis. The sale of such tickets was accordingly discontinued; the Little Rock & Memphis lost an important part of its through traffic and naturally feels itself aggrieved.

Under the English law there would be no doubt as to the rights in the case. The act of 1854 provided that facilities must be given to through traffic in cases of this kind. Subsequent decisions by the courts have made the doubtful points under this law most explicit. The act of 1873 arranges for the procedure to be adopted; while that of 1888 makes matters still more definite.

There seems to be no doubt that the general principles involved in the English law apply to the situation in America; yet, with our statutes as they stand, there is no means of making these principles effective. It is this difficulty which lends the main interest to the case; and it goes deeper than the Commission admits.

"The Commission believes that it was the intention of Congress in the third section to substantially re-enact the requirements of the English statute." We seriously doubt it. The language of those who drafted our act was to a considerable extent modeled on English statutes; the intention of Congress, so far as Congress can be said to have had any intention in the matter, was quite different from that of Parliament. English legislation has been a series of attempts to define rights rather than to check corporate power. It has been but slightly influenced by the desire of members to make political capital. Even where it actually placed somewhat strict limitations upon railroad authority, the law protected one vested right against another rather than attacked vested rights as such. On the other hand, American legislation has been based on the idea of lessening co-operative power. Anything which would reduce railroad rates was considered good; anything which would take away railroad power was thought almost equally good. All other considerations were wholly secondary. American legislatures have been reluctant to give railroads protection against the misdeeds of their own agents, even though the effects of such misdeeds might result in grave abuses. The railroads lost money by such abuses, and the railroads' loss was assumed to be the public gain. The chaotic system of passenger rates under which we are suffering is a natural result of the state of feeling which wanted to decide each individual case against the railroad and in favor of the passenger, even though the latter had got his ticket by fraud, and was using it in violation of contract.

Still more reluctant were our authorities to help the roads in their working agreements with one another. In this respect American and English history are very different. England positively encouraged the clearing-house; she did not discourage pools. As for the Act of 1854 it was very largely animated by the desire to help railroad co-operation, and to prevent refractory lines from standing in the way of others. The natural result was that a well-managed line found it easy to render public service. If some other road stood in its way, the law provided a means for making an arragement.

The Inter-state Commerce law, though having a strong superficial resemblance to English acts, was passed by men of a very different spirit from the Members of Parliament. The underlying idea was that "if thieves (and railroads) fall out, honest men (and shippers) get their due." The pooling clause was a direct result of this idea. The omission of all provisions giving railroads power to enforce their rights was another. If Congress had been half as solicitous for local railroads as it was for local shippers, the case before us could never have arisen. The result of the law in its present shape is that there is no means of enforcing a provision which is admitted on all hands to be salutary.

Congress could not compel one road to give a through rate, without giving another road power to demand it. It hated to give any road any power to do anything which it could not do before, and thus left us where we now stand. This seems to be the whole case in a nutshell.

The Chicago-Kansas City Passenger Differentials.

The resolutions offered at the meeting of the Inter-state Commerce Railway Association by Receiver McNulta, of the Wabash, when he demanded a differential fare from the roads that run fast passenger trains between Chicago and Kansas City, are of considerable interest and we print them in full:

Resolved, That time is money, and that during the existence of an agreement on fares any material reduction in the time of passenger-trains between the same competitive points should and will be construed as equivalent to the cutting of the rate; provided, that a difference of 10 minutes for every 100 miles, or any fraction thereof of 50 miles or more, in no case to exceed 40 minutes, in one continuous train or car service run, should not and will not be considered material.

Resolved, That where a passenger rate or fare has been or may be agreed upon between competitive points, and the time afterwards materially reduced by one or more competing lines without the consent and concurrence of any other competing line between the same competitive points, the non-assenting line is entitled to and shall have a differential, and in case of a failure to agree upon such differential it shall be fixed by arbitration.

Resolved, That any line during the existence of an agreement on fares may, upon 10 days' notice of the purpose so to do, lengthen the time of its fastest through passenger trains between competitive points, 20 minutes or more for every 100 miles or any fraction thereof of 50 miles or more (computing by the shortest line between such competitive points), from the time of its fastest trains at the last agreement for the establishing or maintaining of passenger rates, and such line so lengthening the time of its train is entitled to a differential, and, on a failure to agree thereon, it shall be fixed by arbitration

Resolved, That extra-fast inter-state limited trains, against which no differential shall exist, may be maintained between Chicago and Kansas City, Chicago and Omaha and Chicago and St. Paul, each road making such time as it may see fit, on the following conditions:

Such inter-state limited trains shall be made up wholly of parlor and sleeping cars, and all passengers riding thereon shall be required to have a sleeping-car ticket or a ticket for a chair or seat in a parlor car, for which the usual price for such accommodations shall be charged, and in addition thereto a charge for the extra accommodations furnished equal to $2.50 to a through fare, and in proportion thereof according to the distance traveled, in no case less than $1. No passenger shall be taken on any such trains for whom sleeping or parlor-car accommodations have not been specially designed or designated before the passenger is permitted to go upon such train.

There was some effort to stave off the question, on the ground that speed had nothing to do with the rate question—in short, that time is not money; but the time-honored maxim with which Gen. McNulta opens his manifesto was finally supported by a two-thirds vote of the meeting. The Presidents concluded, however, that the problem was too intricate for them and shifted it to the shoulders of the General Managers. The latter meet once a month, while the presidents have resolved to come together only quarterly.

Concerning the strength of Gen. McNulta's position there can be no question. The principle has been recognized for years, and the logic of the situation supports it at every point. The road on which service costs the most has the inalienable right to sell the service at a smaller profit if it so choose. The provision for fast limited trains of parlor cars, apparently intended to soften the effects of the clash of interests, will not, however, have any appreciable effect in that direction. The point was met by Vice-President McMullen, of the Chicago & Alton, who said the public demanded fast time, but would not pay an extra charge for it. In other words, there are not enough people who desire a parlor car train to pay for running one over the route in question. The question is in one sense simpler than that concerning fast stock trains. In the latter, equality of time as between competing lines is more important than fast time; at least it is so within well-defined limits. But with the live stock that rides in varnished cars there are various reasons for desiring speed. Some people like to ride rapidly just for the exhilaration of the thing. Among a large number of passengers the choice of hours of departure and arrival will be found to be by no means uniform; there are always some to favor an odd hour. Some people favor the train that seems most "exclusive," whatever may be the means for securing exclusiveness. The ordinary passenger trains in the West are not run anywhere near the possible limit of speed, while stock trains are run probably beyond an economical rate.

Gen. McNulta's limit of ten minutes to the 100 miles seems to be rather a weak concession. On 400 miles this means 40 minutes, and that is enough to gain or lose a passenger in not a few cases. The slower line might, in such a case, calculate on making up time when delayed, so as to render its punctuality more reliable than that of the faster road; but with transient passengers the advertised time is generally swallowed unquestioningly, however bad the average actual time may be.

A Chicago dispatch of Tuesday states that the general managers of the roads between Chicago and the Missouri River have agreed upon uniform time for running stock trains. After May 1 the time from Missouri River points to Chicago will be not less than 32 hours.

This will require, by the longest route from Kansas City to Chicago (540 miles), a speed of about 20 miles an hour, including ordinary stops and deducting five hours for a special stop to rest and feed the animals; while the shortest line (458 miles) can, by using cars with feed and water troughs, and thereby avoiding the stop for rest, get through by running at the moderate rate of 15 miles an hour, including stops. We say moderate; and yet, on a single track road and with heavy trains, requiring time to properly handle them at stations, the speed while in motion must be nearer 25 than 20 miles an hour much of the time, while the longer lines must do still better than this. With present braking and signaling facilities it will be generally agreed that curbing competition to this limited extent will be in no wise harmful.

The Lorenzo Collision.

The rear collision at Lorenzo, Ill., on the Chicago, Santa Fe & California last week Wednesday, by which five persons were killed and four others injured, was particularly sad. Although no one, railroad officer or critic, consciously feels that he experiences less horror at the violent death of half a dozen strangers than at that of a single intimate acquaintance, it is true that a tragedy involving a director or other officer makes a marked impression among the employés of a railroad, high and low, unlike that produced by other accidents. Doubtless it is so on the Atchison. Officers of other roads can, however, appropriate the warning. It is quite possible that the agreement to limit the speed of stock trains, which we note elsewhere in this issue, was more promptly and readily effected, in consequence of this disaster. At all events it was that kind of a train that caused the trouble.

The facts of the case are briefly told: Passenger train No. 2, eastbound, was leaving the station, on time, at 4:23 a. m. The stock train, which had been passed a station or two back, followed too closely and overtook the passenger a few rods beyond the station. The freight engine crashed into the rear car about two-thirds the length of it. This was a private car, occupied by J. F. Hart, a director of the Chicago, Kansas & Western, one of the Atchison's controlled lines, and his family. All the occupants of the car were badly scalded, and Mrs. Hart, son and three other persons were killed. Mr. Hart is still in a dangerous condition. The engineer states that he was intently watching the ground for the whistling-post, but, on account of the fog, saw nothing. He was running 20 miles an hour, and calculated to arrive at Lorenzo about 4:30. The telegraph operator states that the fog was very dense. The fireman of the passenger train says the freight gave no whistle signal for the station. As the passenger train was on time, there is no question that the freight had been running too fast. The claim that the fog made a correct estimate of the speed impossible is hardly tenable, and so marked a deviation from the proper rate should have been observed and corrected by the conductor.

The remedy for this sort of accident is, in brief, to have better trainmen or else make use of the block system, or both. That it pays to have the very best trainmen—those who are both alert and experienced—has often been asserted in these columns. That there is a large element of danger in intrusting trains to men who only imperfectly know the road has been stated over and over. If the men on fast trains are competent and careful the statement implies that they have had ample experience on slow trains before being intrusted with fast trains. From present information there can be no question that the conductor is largely to blame in this case. The theoretical requirement that the conductor and engineer are jointly and equally responsible for the safety of a train has a practical application, and needs much more attention than it has yet received. Regulating the speed in such cases as

this is one of the points wherein the conductor must, in a sense, interfere with the engineer's prerogative, and there are points in which the engineer must apparently step on the conductor's toes in order to fully provide against certain dangers; but the fact that the adjustment of these duties is a difficult and delicate task does not remove the necessity for making it. It is quite likely that the size or location (or absence) of the station slow-board contributed more or less to this accident. A single slim post 5 ft. high is not discerned in a dense fog without close care; nevertheless, in the absence of satisfactory landmarks the most ordinary common sense should teach trainmen to carefully watch the rate of speed at which they are running.

But whatever may be said about these remedies for train accidents and the impracticability of applying them, there is still another method, and a radical one, concerning which there is little disagreement except on the point of expense. However chimerical the recommendation for superfine improvement of men may be regarded, no one can deny that the block system is both simple and safe, and that it can be worked by men of ordinary intelligence. That is to say, it is fully agreed by all who have had experience in working it, that with the same degree of intelligence in the men, rear collisions can be much more certainly prevented by the use of the block system than by depending on the ordinary American methods. We do not now have to go for instruction to England, where the traffic is very dense and labor is cheap, nor to the Pennsylvania Railroad, where moderate dividends are secured, where extravagant ones are not demanded, and where Wall street speculators do not hamper the efforts of competent managers; the block system is now in use on a sufficient number of single-track roads and those handling a light traffic to make attention to it much more of a duty than it was a few years ago. The uniformly favorable testimony concerning it from officers of single track roads is of a character that should not be neglected. One of the neighbors of the Santa Fe has used it with especial satisfaction.

It is to be noted that a block system which allows for only 300 ft. leeway would very likely have proved no protection in the case under consideration. This is a striking evidence of the necessity of distant signals and of having them large and conspicuous, or at least of employing the distant signal principle. In structing signalmen to hold the signal at danger until the train has passed 300 ft. beyond it is indeed an effective distant signal, so far as that distance can be made effective in any way; but it is needless to point out that under such circumstances as those at Lorenzo, a much longer space than this is necessary. Wherever it is impossible to have both a home and a distant signal, connected with each other, it is of the utmost importance to let trains get a long distance beyond the operator before he allows a following train to come to his station at full speed.

Adjusting Southern Rates.

The committee of the Southern Railway & Steamship Association, lately in session in New York City, has adjourned. These gentlemen are much perplexed by the problems confronting them. Last winter the officers of the Southern roads were summoned before the Inter-state Commission, and after a hearing were told that there were too many violations of the long and short haul clause in their territory, and that the freight rates should be arranged more nearly on the lines laid down by the Inter-state Act.

The Southern freight men think that, although the Trunk lines have hard problems of their own, they have nothing of the kind quite so difficult as this. The routes cross each other continually, so that the terminal of one line, and therefore a maximum rate point, is a half-way place, and therefore a lower rate point, on another. Atlanta is reached via Chattanooga, and also Chattanooga via Atlanta. This state of things, now a great source of perplexity, was brought about years ago by the brotherly feeling engendered by the Association, which helped along the formation of competitive routes to each of the common cities. This was done to such an extent that interlacing routes were established in many directions.

The commission thought that at many points there were violations of the short haul clause which could hardly be justified. The merchants of Spartanburg, S. C., complained because their rates from Chicago and New York were higher than Atlanta's. The rate to Spartanburg is $1.24 first class from New York, and to Atlanta $1.14. The local roads in the Spartanburg territory feel that they cannot afford to make the sacrifices necessary it a reduction on all points is made to the Atlanta rate. It is proposed, therefore, that the New York-Atlanta rate be raised from $1.14 to $1.20. But on account of the interlacing of competitive lines, such an advance to Atlanta necessitates the same advance to the whole Southern territory. To this a respectable part of the association is opposed. Although the Southern roads, from the nature and lightness of their traffic, are high-rate lines, and concededly so, yet it is said there is a limit beyond which it is not wise to go. Rates above a normal standard are more subject to cuttings and wars, and interfere seriously with the development of the country.

But even with this obstacle out of the way, the situation in Tennessee proves a hard one. The rate now from New York to Chattanooga is the same as to Atlanta, $1.14, and if advanced, $1.20. But the Nashville rate is 91 cents. The southern route to Nashville from the coast is through Chattanooga, and of all the seaboard traffic the Chattanooga lines carry 75 and 80 per cent. How shall these Old Dominion and Savannah lines continue to keep this important Nashville business and at the same time hold up all their short haul rates which are a third higher? No solution of this question is yet in sight. Nashville is considered a trunk line point. The suggestion that the Louisville & Nashville raise its rates between the Ohio and Nashville meets no approval, as hostile to the prosperity of that city, and yet the L. & N. feels so strongly the burden of its position before the Inter-state Commission that an appeal to the Supreme Court is talked of. Besides, an advance of 10c. first class would put the Nashville above the Memphis rate. For the Chattanooga lines, the Nashville situation shows a state of affairs where the strict enforcement of the long and short haul clause will work undoubted injury, and at the same time no good to anybody. On the other hand, if these places are to be excepted, merely because of railroad competition, where can the Commission draw the line?

The tightening up of the various agreements between the roads west of Chicago has brought out the fact that the Chicago, Milwaukee & St. Paul has a contract with Armour & Co., by which the mileage paid by the road on refrigerator cars of that firm is to be one cent a mile for five years. The regular charge on this and other roads has been ¾ cent per mile, the same as for ordinary interchange cars; but a higher rate, such as that disclosed in this contract, has no doubt been employed as a means of paying rebates on heavy shipments by a number of roads, both east and west of Chicago. As is well known, this firm, as well as other large shippers of dressed beef, furnish their own cars for most of that traffic.

All classes of railroad men seem doomed to find a fly in their ointment. Just as there seems to be some hope of car service reform, there comes this snag, which may quite possibly disturb interchange rates for some time. It is essential not only to a due observance of the law, but to harmonious relations among the roads, that the car-service rate be the same on all roads, so that if this contract stands, all refrigerators must be paid for at exorbitant rates for a long time. The Western roads are agreed that rates must be uniform, and there is, therefore, no present likelihood of further discrimination between shippers by means of this device; but this does not remove the vicious consequences of the agreement. It will be no great trouble to keep a separate account for private owners' cars, but a high rate on a considerable body of cars will, of course, have its effect in any negotiations for a lower rate for any kind of car service. It might be inferred, from the statements of average performance of cars recently published, that Armour & Co. would have no very fat contract, even at a cent a mile; but, as is well known, refrigerator cars are not held down by any average. They make quick journeys and waste very little time at terminals. The ordinary railroad sharper might perhaps suggest that the St. Paul road make very slow time with these cars on the return journey and thus worry the other party to the contract sufficiently to induce him to give it up; but unfortunately for this hypothesis the head of the packing firm is a director in the railroad company. Mr. Armour may be said to stand at both ends of the contract. Although secret long-time contracts concerning such minor matters are almost always found to be against public policy, it is improbable that anything can be done towards abrogating this one unless the parties to it voluntarily modify the rate. There is some talk at Chicago that this may be done.

Some interesting experiments have been made at the Lehigh University by Mr. Lester P. Breckenridge, with a view to determining constants which will enable a machine designer to calculate how much power will be required to drill holes of given dimensions at various speeds of the drill spindles. It is not to be expected that there is much uniformity in the practice of various shops in this matter, but in all modern machine tool operations where competition has to be considered it is the endeavor of the proprietor of shops to produce the work at the least cost of time and money, keeping always in mind the accuracy necessary for the particular work in hand, as well as the wear and tear of shop tools resulting from rapid methods of reaching the desired end. However, while there is little uniformity in the output of the same class of machines working upon identical kinds of work in different shops, yet such non-uniformity is not the result of any set of conditions for whose existence there is any absolute need. The output of like tools on similar work ought to be nearly uniform, and managers in charge of shops in which the tools have only a minimum efficiency can best bring about a change to, at least, average efficiency by carefully comparing their methods with those of other shops building similar products and by also endeavoring to approach the actual performance of machine tools, the records of which are given by the mechanical press. It is with a view of furnishing memoranda of actual performance that the following record of the maximum performance of a Prentice drill press are quoted from the *Journal of the Engineering Society of the Lehigh University*. To machine designers the first two columns are particularly interesting; to managers of machine shops, the third and fourth columns of the table give information which will enable them to compare the efficiency of their own men and tools with other men and other tools under similar conditions. The drills used in these experiments were all twist drills. It is the intention of Mr. Breckenridge to continue the experiments with a view of obtaining similar information respecting other tools used in machine shops. If any of our readers have records of twist drill performances which are comparable with these we shall be pleased to receive them.

Diameter of drill, inches.	Depth of hole drilled, inches.	Shortest time required to drill when feeding		Maximum pressure on drill while drilling at start. Lbs.	Maximum pressure on drill while drilling with full diameter of drill. Lbs.
		By power. Seconds.	By hand. Seconds.		
¼	½	16	14	400	350 to 400
¼	1	33	29		
½	½	32	21	900	800 to 900
½	1	30	45		
¾	½	42	38	1,100	800 to 900
¾	1	80	66		
1	½	47	48	1,450	1,000 to 1,150
1	1	92	107		
1¼	½	—	102	1,800	1,000 to 1,150
1¼	1	201	190		

Reports have been published this week in Chicago, Pittsburgh and other places to the effect that large numbers of Baltimore & Ohio employés refuse to join the reorganized relief association of that road, and that some of them threaten to strike. It is stated that considerable compulsion is used, and that a good many employés will resign rather than comply with the demands of the company in connection with the relief association. The officers of the road deny that there is any compulsion, and aver that the reports of dissatisfaction are originated by life insurance agents. Other statements seem to indicate that gentle compulsion has been tried, if not actually enforced. Interviews with both officers and employés are published, but tney do not give the bottom facts, apparently. The former say that the employés will not be compelled to join, while the latter claim that compulsion is used. The chief allegations made with definiteness are that the rates are onerous, and that under the old organization assessments are prompt while benefits are paid very slowly. In cases of ordinary sickness the first eight days are not paid for, so that an employé lying off a week loses his pay, out and out. Doubtless, under the former régime, before the Relief Association was established, absences for such brief periods were more generally winked at than under the relief organization. Clearly, the objections of the men, as far as published, are based on their past experience rather than upon any theoretical defects in the new plan.

The Chicago *Tribune* prints the form of contract which new employés are required to sign. It releases the company from liability for all other claims for personal injury or death, and invalidates the insurance policy in case any sum is recovered through the courts. The *Tribune* also prints a clause from the company's circular reading as follows:

Membership in the relief feature will be voluntary to the following classes: Officials receiving an annual compensation of over $2,000; employés who entered the service prior to May 1, 1880, and who have been continuously therein since that date; clerks, telegraphers, and others of similar employment who are in no degree exposed to accidents in the service; and agents receiving commissions.

The inference is plain that the great mass of workmen are not to be included among the voluntary classes, says the *Tribune*. It appears that the new scheme makes a distinction between employés engaged in operating trains and rolling stock, and those not so engaged. A man receiving $50.01 to $75 per month, for instance, pays $3 per month if he is a trainman and only $2.25 if he is a clerk.

We have received a second letter from "Ave" on cost of service as a basis of rates. We regret that we have not the necessary space for publishing it. We agree fully with the writer in some of his criticisms on the present practice, and are glad to see that he, on his part, is disposed to make certain reservations which would bring us much more nearly in harmony than might have appeared at first sight. But we can by no means agree with some of his statements: "More paying weight for each locomotive-mile," he says, "is covered by the fact of larger car-loads." Does he mean that with the cars and car-loads of 1889 *and the locomotives of* 1889 we could handle traffic as cheaply as we do now? And if not, what does he mean? He says: "the roads which have best served the public are the ones on which rates are made with the most regard to cost." These latter, we believe, are the German railroads; but we very much doubt whether they can be said to be the ones which have best served the public. As for American roads, none of them have come near enough to an application of the cost theory to furnish instances in point. The general principles involved cannot be fully discussed within the limits at our command; we can only refer our correspondent to Alexander, "Railway Practice," pp. 3–12, and Hadley, "Railroad Transportation," pp. 108–124 and 242–248.

The state railroads of Baden have introduced a system of workmen's tickets, differing in various respects from that adopted elsewhere. In the form in which they are usually issued, they entitle the subscriber to one round trip, third class, every working day for one month. The chief peculiarity is, that they are calculated on an equal mileage basis, the rate being 0.75 pfennigs a kilometre, or about three-tenths of a cent a mile. To apply equal mileage principles to to this class of business, is running a theory into the ground. It must produce unequal loading of the trains, with empty cars where the traffic might pay, and enormous crowds of non-

paying passengers just at the termini. In business of this kind it is far better to go to the other extreme and make rates nearly independent of distance. To the railroad company it is a matter of indifference how far it carries this sort of traffic, as long as there is space in the trains. If it can afford to carry a man three miles for a cent—which seems rather doubtful—there is surely no special object in prohibiting six-mile traffic which will not pay two cents. But if, as seems more likely, two cents will barely cover the cost of carrying a workman six miles, it is rather suicidal to offer to carry him three miles for one cent. However, a great many people are willing to commit suicide for the sake of a theory.

The effect of the amendments to the Inter-state Commerce law seems to be very strikingly shown by the March report of the Cleveland Weighing Bureau, printed in another column. In January shippers' weights were increased 17 per cent., in February 12 per cent., and in March 28½ per cent. We have no full record of past reports, and cannot judge of the legitimate fluctuations from month to month, but the sudden increase is large enough to give color to the statement of a Cleveland paper which asserts that "prior to March 2 some of the agents were disposed to regard the inspector as an invader of their castles, and they accordingly lent him spare aid and comfort in detecting false billing. But the law that has now been posted in large black letters in every office has changed matters."

The Train Rule Committee of the Time Convention has already agreed upon the diagrams to be printed showing the positions for flag and lamp signals on locomotives and on the rear of trains, and the standard code with the diagrams added, is to be issued within a few weeks. These diagrams are similar to those issued last year by the Wabash road, and illustrated in the *Railroad Gazette* of Nov. 2, page 716. The Wabash book, however, has in addition a large number of standards, which are applicable especially to that road, such as slow boards, whistling posts, switch targets, etc.

NEW PUBLICATIONS.

Profit Sharing. A Study in the Evolution of the Wages System. By N. P. Gilman. Boston, Houghton, Mifflin & Co., $1.75.

This volume is an apparently careful compilation of accounts of all trials of profit sharing that could be heard of in the United States and Europe, and embraces a history of the important experiments in this line since 1842, when M. Leclaire, a Parisian house painter, was the first to put it in practical operation. In the historical and descriptive portions the author confines himself closely to statements of fact, and introduces his arguments for the further extension of this principle in a separate chapter. It appears that the largest and most important experiment of the kind in the United States is that of the Pillsbury Flour Mills, at Minneapolis, where $125,000 was distributed in three years, and many men received 33 per cent. bonus on their wages. The oldest American system is that of the Peacedale Mills, at Peacedale, R. I., where the employés began to participate in 1878. Other American concerns which have adopted the plan are: The Haines, Jones & Cadbury Co., Philadelphia; the N. O. Nelson Mfg. Co. and St. Louis Shovel Co., St. Louis; the Springfield Foundry Co.; the Bucyrus Foundry & Mfg. Co.; Rand, McNally & Co.; Yale & Towne Mfg. Co. and Page Belting Co. Our readers will remember that the Toledo, Ann Arbor & North Michigan Railroad has adopted a scheme of this kind, although it has never yet divided any profits. The majority of the instances cited are experiments undertaken within two or three years past.

The work gives an account of profit sharing on the Paris & Orleans Railway of France. Many of our readers will recall the details of the doings of this road as described in a pamphlet by F. Jacqmin published by the *Railroad Gazette* several years ago. M. Bartholony, President of this company, first suggested profit sharing to the directors in 1844, and the principle was established at a stockholders' meeting of that year. For a few years the officers and employés were divided into classes, and the higher classes received larger percentages on their salaries than did the lower. Mr. Gilman states that this principle was thoroughly sound, but in practice the lower classes received too small a share of the profits, and later it was decided to pay all employés alike in proportion to their salaries. This principle was subsequently enforced by a decree of the Minister of Public Works. The directors were somewhat dissatisfied at this, but finally decided not to abandon the system. From 1850 the State enforced a more complicated system, by which a portion of the sum due each employé was paid into savings banks and pension funds. In 1852 the road was consolidated with others, and the profits for a while were still higher, the employés getting 34 per cent. on their wages in 1852 and 41 per cent. in 1853. The share of the employés was then reduced, a variable scale being employed. Later an aid fund was added, and subsequent modifications went into operation in 1865, which finally reduced the dividends of the employés to little or nothing. Even before the benefits were entirely abolished the various funds absorbed so large a portion of them that the cash payments were too small to keep up the enthusiasm of the men. For the last 17 years the cash dividend has been virtually nothing. Consolidation with poorer roads has diminished the profits, and the right to an eventual pension is now the only benefit received by the employés in this department. The whole sum divided among salaried employés from 1844 to 1883 was over seventy million francs. It is noticeable that the division of a considerable sum, such as would produce a marked effect on the feeling and conduct of the employés, was made with regularity only when the railroad company was earning very good dividends—10 to 15 per cent. and over. There is abundant evidence of the excellent influence on the personnel of the road when the system was in full operation, as it was previous to 1860. Men were careful in their work, economical in the use of materials and had a lively interest in the company's welfare, not only individually, but as a body, careless ones being promptly rebuked by their fellow-laborers; but then, as now, one of the first places selected for retrenchment, when financial pressure was felt, was this department of so-called indirect or invisible economy.

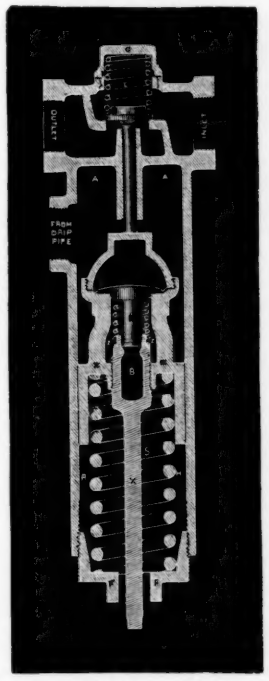
Not only the special chapter on this railroad experiment, but the whole of Mr. Gilman's book, will well repay perusal by railroad directors and officers. The work is recommended as valuable by President F. A. Walker, of the Massachusetts Institute of Technology; Hon. Carroll D. Wright United States Commissioner of Labor, and Professor R. T. Ely.

The Lumberman's Hand Book.—The third revised edition of W. B. Judson's handy little volume of Inspection and Grading Rules in use by the lumber dealers at the various cities and lumber centres, has just been issued from the office of the *Northwestern Lumberman*, Chicago. The book has, besides the inspection rules, a large amount of other information of value to dealers and others handling lumber.

The Mason Combined Reducing Valve and Steam Trap.

This device was originally designed for use on those systems of train heating by steam in which the locomotive pressure is reduced by a valve to about 40 lbs. in the service pipe and is then regulated separately for each car. The advantages of having the reducing valve and trap in one shell are obvious. This device occupies but little more space than is needed for a globe valve, is easily applied, and, it is said, will not freeze. It has been applied also to steam heating systems for buildings and for manufacturing purposes, where it may be placed in the steam pipe from the boilers, and the return pipe connected with it instead of into an ordinary steam trap.

The steam pipe from the supply enters the passage marked "inlet," and, passing through the main valve, which is normally open, fills the system, and thence through the return or drip pipe the condensation comes back into the trap *A*. When the pressure in the system rises above the desired amount to which the valve has been set, by compression of the spring *S*, the piston *Z* is forced down, allowing the main



Mason Reducing Valve and Steam Trap.

valve to close, assisted by the high-pressure steam and the spring *L*. Steam is thus shut off from the system. This operation is repeated whenever the pressure in the piping is reduced below the required point.

The trap operates on the expansion principle. The chamber, which forms a part of the piston, and is carried with it in its movement, is filled with an expanding compound. The valve is opened when the trap is cold, so that the condensation can pass out freely. When the trap is free from water the steam expands the liquid in the chamber and shuts the valve *K* by the metal diaphragm. When condensation again accumulates, the temperature falls, the fluid in the chamber contracts and the valve is again opened.

The trap can be adjusted to discharge at any temperature by turning the rod *X*, which is fitted for a wrench. The reducing valve is adjusted to the desired pressure by turning the plug *F*. The drip from the system can be attached to either side of the valve. This device is made by the Mason Regulator Co., of Boston.

The Rules of Interchange.

The regular monthly meeting of the Western Railway Club was held April 16 at its rooms in the Phenix Building, Chicago, Jacob Johann in the chair in the absence of President Rhodes. The Secretary read a letter from President Rhodes, suggesting that the M. C. B. Interchange Rules be taken up for discussion by the club, and inclosing a letter from Mr. Adams, of the Boston & Albany, in regard to them. The rules were taken up and discussed seriatim.

Mr. SCHROYER (C. & N. W.): Rule 2 says that cars must be delivered in good running order and returned in as good general condition as when received. Now we all know that there is violation of it right along day after day, because cars are constantly delivered to us that are not in good running order. It is a violation of the Master Car-Builders' rules to ask a road to take a car that is not in good running order. We do not do anything of that kind on our road, but we do ask other roads very often to transfer the load and return the cars to us and we will make the repairs. I do not know that we can insert a rule here which we can enforce any more rigidly than we can this one, but we all know that that rule is violated every day. Just what the remedy is I am unable to say.

Mr. LEWIS (C., B. & N.) moved that Rule 2 be changed to read as follows: "Cars must be delivered in good running order and returned in as good condition as received, except as provided by Rule 4." Adopted.

A motion was carried to appoint a committee of five to look over the Rules of Interchange and report upon them at the next regular meeting of the club, and the following named members were appointed as the committee: Messrs. Verbryck (C., R. I. & P.), Schroyer (C. & N. W.), Rhodes (C., B. & Q.), Barr (C., M. & St. P.), and Crosman (*Railway Review*).

The Secretary then read the first point referred to by Mr. Adams in his letter: "How large a piece must be broken out of a flange of a wheel to change the term 'chipped' to 'broken'?"

Mr. SCHROYER: According to the rule, anything that exceeds the figures given here (in the rule) must be considered as a break. We must acknowledge that almost the entire safety of the wheel depends on the flange, and I do not think it is right for any road to ask us to accept a wheel that is defective in any manner in the flange, and I think the rule of the Master Car-Builders' Association is about as near correct as any that we could substitute for it. While it is true enough that there may be a chipped spot in a wheel that might exceed these figures, the question is whether it is going to endanger the safe running of the wheels, and when you consider the great variation that now exists in the gauges of our wheels and the gauges of our tracks, the construction and laying of the frogs and guard-rails, it is a matter that should be seriously considered before we decide that a wheel with a defective flange should be accepted at all. I do not think that any defect on a flange exceeding the figures laid down in Rule 3 should be accepted.

We have on our road cars with loose wheels, the wheel loose on the axle, that our inspectors have accepted. Now I do not consider that any road has any moral or legal right, according to our rules, to offer us a car that is in that condition, unless we are so equipped at the point where they offer us the cars that we can make the necessary repairs. When that is done, it is done only as an accommodation which we are willing to make, but we are not always willing to accept them and run the cars to a point where we are equipped for making those repairs.

Mr. VERBRYCK: I agree with Mr. Schroyer as far as chipping is concerned, but he does not answer Mr. Adams' question at all as to how far it can be chipped before it can be considered a broken wheel.

Mr. TOWNSEND (Chicago & Alton): Mr. Adams asks a question that is very much easier asked than answered. I do not know just how much a wheel should be chipped to be called a broken wheel. Unless a piece of the flange was knocked clear out I would call it a chipped flange—not safe to run, but not a broken wheel.

Mr. SELBY (Chic. & Atlantic): There is a great deal of damage done by chipped flanges at various times. Last winter I noticed several troubles caused by chipped flanges. I think we ought to be very careful and not go too far in reference to chipped flanges. I do not think I would call them a broken wheel by any means, because a broken wheel means a great deal. They can be used for certain purposes that would not be detrimental. I think the rules as laid down are sufficient.

Mr. SCHROYER: It is absolutely necessary to specify certain limits beyond which a part of a car can be condemned; but in this particular case it is a matter of very little consequence when the limits exceed the figures given whether the the term is chipped flange unsafe to run, or broken flange unsafe to run, because there is no question but what the piece is broken out, and I would not like to receive a wheel with a flange that is chipped or broken to exceed the figures laid down here. The Master Car-Builders have given the length of the slid-spot as 2½ in. I know of inspectors who take that literally as it is laid down, and have delivered to the Chicago & Northwestern wheels with slid-spots on them 2⅝ of an inch in length. We have taken the cars on our road, and before we had ten miles of service from that pair of wheels the slid-spots exceeded the limits of the Master Car-Builders' Association, and we had to replace the wheels. The Master Car-Builders, in self defense, have to name a figure, but it is left with the good judgment of the inspector himself whether he can in justice accept a car with slid-spots that come so near the limits as some that we have accepted on our road. If there is one place where a man on a railroad is needed with good judgment, it is the inspection of cars. In regard to Mr. Adams' question, I think it is a matter of very little importance whether we call it a broken flange or a chipped flange. If the break is serious enough to injure the running of a wheel, it is something pretty serious even if it is but the chipping of a wheel.

Mr. VERBRYCK: I presume that Mr. Adams has made out bills against other parties for broken wheels where they would call it a chipped flange, and he would like to know whether, if the break exceeds a certain limit, he can make a bill against another company for that wheel, or whether he has got to stand it. I have had the same difficulty myself.

Mr. SELBY: I agree with Mr. Verbryck that the rules do not cover breakage accurately enough for the company to make out a bill. I think there ought to be a rule laid down so that a company could collect money for a chipped flange.

Mr. VERBRYCK: I will say further that I have had bills returned to me for broken treads that were broken away beyond the limit of the Car-Builders' Association rules, a large piece, 8 or 10 in., broken out. I thought I was right in making the bills, but they were returned to me. I think there ought to be some specific definition as to how much ought to be a chipped flange and how much a broken wheel.

Mr. SCHROYER: I judge from the remarks of Mr. Selby and Mr. Verbryck that they think that if we deliver a car to them which is perfect on delivery, and they return it to us at our interchange station, and the wheels, when returned to us, are broken to exceed the limits of the Master Car-Build-

ers' Association rules, that we should bill against them for any wheel that is broken in their service. Now I differ from both of them in that matter. I do not think any road should bill against another for a wheel broken in their service, unless that wheel is broken as a result of defective construction, or an inferior quality of metal used in the wheel.

The Secretary then read the next question of Mr. Adams, as follows:

"It seems to me that Rule 27 conflicts with Rule 11, and I hope you will give it some attention, as it has been some trouble to us. The railroad companies say they do not own the cars, and it is very difficult for us sometimes to find out who does own them. It is evidently a dodge to compel railroad companies to make repairs that actually and properly belong to private companies who do not reciprocate in the interchange of cars, and consequently take no risk.

Mr. LEWIS: A railroad company has no right to reject a bill if the initial of the company is on the car. The trouble has been that matters of this kind have been fought out with the company instead of referring them to the Arbitration Committee.

Mr. VERBRYCK: The Master Car-Builders' Association meet infrequently, and matters submitted to them are decided only after a long time. The rule that decisions of the Arbitration Committee should only stand until the next annual meeting should be made clearer. As I read the rules, their decision is final. It might be final until the next meeting of the Association, when the rulings might be revised.

The PRESIDENT: Information is not given at the right time. Every one waits until the end of the year when the meeting takes place, and then everybody wants to talk at once, and there is not time to attend to it. If, when you have a case, you will write it up and present it to the committee, they will have an opportunity to look it over.

The Secretary then read the next question of Mr. Adams, as follows:

"Rule 19 makes a road liable for wrong material, and generally very properly so, but I think exception should be made in regard to box lids or covers. This seems to be the sentiment of the various clubs so far as I can learn. If the cover is not the standard of the road, it should not be objectionable, provided the box conforms in other respects, and the key, brass, etc., are uniform. I also think that under the circumstances cars should be allowed to pass with a good reliable draw-bar, at least until a large number of cars are equipped with the so-called standard bar. This was discussed at the Central Club at Buffalo, and it was agreed by all present that cars were greatly delayed by quibbling over the draw-bars used. At the last meeting of the Central Club, the unanimous opinion was that cars with oil-box covers in good order, and equipped with a good draw-bar, should be passed without protest."

Mr. SELBY: I would like to see that rule changed for the special benefit of the Chicago & Atlantic. We handle about 90 per cent. of those cars in our business, and have a vast amount of trouble with the draw-bars; in fact, constant trouble. The draw-bars are good when they are offered to us and we take them and in many instances have to card them off our line in order to get rid of them. The draw-bars that are put in are just as good as can be put in, of proper length and strong enough for all purposes. And I do not see any reason why they should not be accepted until we can get the standard draw-bars as laid down by the Master Car-Builders.

Mr. PECK (C. & W. I.): I do not doubt there is more freight detained in Chicago on account of cars that have wrong draw-bars than for any other cause. Some roads have six or eight patterns of draw-bars, and if a car gets off the line, it is taken for a wrong draw-bar, and it will afterwards turn out that it is one of their own patterns. There is more trouble on account of wrong draw-bars than anything else we have to contend with.

The CHAIRMAN: If every master car-builder and every car inspector would look at the matter in the proper light, and if the master car-builder would give the car inspector proper instruction, I do not think there would be so much trouble. In order to avoid trouble and keep cars moving, I have given my inspectors orders that if the draw-bars were sound and safe, that is, our own cars coming home with wrong draw-bars, we would not stop to quibble with the foreign road about it, but we would take it and wait for a car from that road to come along and then we would slip in that draw-bar. If you would all be honest and work in that direction, you would save yourselves a great deal of trouble.

Mr. VERBRYCK: I have done the same thing. At my shop you will see a kind of museum of draw-bars. If one of our cars comes in with a foreign draw-bar and it is a good one, I merely take it and hold it, and wait until I get one of their cars, and then put it in.

Mr. SCHROYER: We refuse cars with foreign draw-bars; we do not hold the car, but our inspector will wire the inspector of the road delivering the car to us to give us a car with such a draw-bar. We are getting so many draw-bars in our service that we have got to put a stop to it. If we do not draw the line as to what we will accept, we shall lose after a while all knowledge of what is our own bar.

As this is an informal discussion, and for information, I would like to have an expression of the members on that clause of Rule No. 6, "No cards shall be honored as voucher if presented later than six months after the date of the card." I was opposed to that rule when it was adopted, and I am still opposed to it. If our company damages a car and the card is not presented within six months after its date, I do not think it exempts us from paying for the repairs. The fact of the card signed by our inspector being on the car is positive evidence that we damaged the car, and we should pay for that damage, whether the card is presented in six months or two years.

Mr. TOWNSEND: I agree with Mr. Schroyer on that point, and as far as the Chicago & Alton is concerned will carry out the idea. We sign right along now for repairs that have been done where the cards have been given ten or eleven or twelve or thirteen months. We do not pay any attention to that six months' limit and do not think it is right.

Mr. VERBRYCK: I agree with Mr. Schroyer and Mr Townsend that if we damage a car we are liable. The only trouble is that when a card runs as long as that, they are liable to make out bills against us for a great deal more than our card called for at the time it was given. I am getting bills every day from different roads that call for a great deal more than our cards authorize.

Mr. SCHROYER: We have sent cars home as being unfit for further service by the advice and consent of the parties owning the car; but where in returning those cars to the original owners it was necessary to ship them over some intermediate line, they have refused to accept the car with one of these cards on, unless we would put on a Master Car-Builders' in addition. You can readily see the position we are placed in as a result of having a car of some foreign road in our service that is unfit for further service as a result of its decayed condition, and then being compelled by some intermediate road to put a defect card on the car. If that car is damaged or entirely destroyed in the service of the company having it in their possession, of course they will come back on us for damages on our defect card, whereas in reality there is no damage to the car because it is unfit for service.

Mr. LEWIS: There is no definition of how the cars should be returned to the road owning it, with regard to the payment of mileage on the car. Ordinarily we return a car over the road we receive it from. If it is an empty car there is question about it, but in this case you say it is not safe to run. I think that point should be defined in the rule.

The CHAIRMAN: I think the committee that has the rules in charge should very definitely provide for that. It seems to me that the routes over which a car unfit for service came should take it back home. I do not think that any mileage ought to be paid on a car of that kind. It ought to be returned home empty over the route that it came on. That is my opinion, but it is a very complicated matter, and it will take a pretty wise committee to give a good clear rule on that subject.

Northern Pacific Colonist Cars.

In the course of the recent discussion in the Northwest Railroad Club on heating passenger cars, Mr. J. C. Barber, of the Northern Pacific, made some interesting statements regarding improvements in the construction of some emigrant or colonist cars, lately built for his road, for protection against cold weather. Mr. Barber told the club that the improved method of construction adopted in the cars to which he referred made a difference in the ease with which heat is maintained in them of 50 per cent.

The two dead floors are of $\frac{7}{8}$ in. white pine 5 in. wide, tongued and grooved, and form, first a 3½ in. dead air space, and above that is a two inch space filled with mineral wool. Above this is the lower floor laid diagonally and secured to sills and joists. It is of clear pine $\frac{7}{8}$ in. thick and 5¼ in. wide. The top floor is of clear yellow pine $\frac{7}{8}$ in. thick 2½ in. wide, tongued and grooved and laid longitudinally from end to end of car. The dead air space in sides is filled with hair or felt. The storm sash is fitted with a shallow groove extending around the outside edges, into this ¼ in. rubber tubing is fastened by means of brads. This forms a packing that excludes all snow. The inside finish is of hard wood throughout, ash and birch being used. The head linings are of birch finished in the natural wood and without ornamentation. It is necessary to thoroughly wash all parts of these cars at the end of each trip, and in consequence the use of canvas for head lining has been discontinued, as it rots very quickly, and must be replaced.

Thirteen adjustable tables of white ash are provided, and when not in use are kept in a suitable closet, which has, above the space for storing tables, suitable lockers for carrying provision packages belonging to passengers.

No mouldings are used on inside finish; all panels are grooved and glued into stiles and rails. The adjustable head boards make the berths as exclusive as those of a Pullman sleeper. Rods are provided for hanging curtains in front of berths, and clothes hooks are placed in each section. In the ladies' toilet room a 2-in. marble slab is used on wash stand in place of the wooden one, as is usually the case. The kitchen has a large size fire-proof wrought iron range. An extra large fuel box, with capacity for ten bushels of coal, is also placed in the kitchen. There are two tanks for water carrying, of drinking water two barrels, and for washing three barrels. The cars are lighted by means of six Adams & Westlake Acme lamps, which are fitted with Bell's fire-proof lamp ventilators.

Improved fire-proof Baker heaters are used to heat the cars and each heater has 350 ft. of pipe attached to it. This heater and the range are insulated from the woodwork of the car by means of double screens of galvanized iron. Additional storage room for parcels, etc., is furnished in the shape of boxes under each seat, which are placed at a height from the floor to keep them from the dirt.

The car trucks are the N. P. standard, with sides and bolsters double plated and double trussed. Wheels are 36-in. Paige steel tired, and the axles are also of steel. The cars are furnished with the Westinghouse air signal.—*Northwestern Railroader.*

TECHNICAL.

Car Notes.

The Canadian Pacific has just received from Barney & Smith Manufacturing Co., of Dayton, O., two sleeping cars at a cost of $36,000 for the Toronto route. The length of each car is 67 ft., and they are 10 ft. wide. The outside finish of the car is sheeted mahogany, the inside white English oak and mahogany. Electric lights are used.

The parlor cars running on the Long Island road are being refitted by the Pullman Palace Car Co. Five or six additional cars of the same kind will be put on. The same company is also overhauling the equipment on the Central of New Jersey and Philadelphia & Reading roads, and introducing gas throughout. The cars of the Woodruff Co. on these roads came into the possession of the Pullman Co. by the recent consolidation.

Bridge Notes.

The County Commissioners will receive proposals until April 20, for the construction of an iron bridge across Chagrin River at Mayfield Township, O.

The City Engineer of Buffalo, N. Y., asks for proposals, until April 22, for constructing two iron bridges over Buffalo River.

The Pennsylvania, Poughkeepsie & Boston has awarded the contract for the construction of the iron bridge across the Delaware, at Portland, Pa., to the Edge Moor Bridge Co., of Wilmington, Del. The partially constructed wooden bridge will be torn down, and the new structure is to be completed by June 1.

Application will soon be made for a charter for a bridge from Reynoldton to Dravosburg, Pa. It is stated that of the proposed capital stock of $75,000 nearly $50,000 has been subscribed. Plans have not yet been prepared.

The Shiffler Bridge Co., of Pittsburgh, Pa., is building a new girder shop, 60 ft. by 300 ft., and a new blacksmith and forge shop 85 ft. by 200 ft. Among other contracts the company is erecting four viaducts and two girder bridges, aggregating 950 tons, for the Louisville & Nashville; also, a number of truss bridges and viaduct for the Louisville Southern and Pittsburgh, Cincinnatti & St. Louis roads.

The stockholders of the King Iron Bridge & Manufacturing Co. of Cleveland, O., this week elected directors, who chose the following officers for the ensuing year: Zenas King, President; James A. King, Vice-President; Harley B. Gibbs, Treasurer; and H. W. King, Secretary.

Manufacturing and Business.

J. H. Williams & Co., manufacturers of drop forgings, Brooklyn, N. Y., have recently made large additions to their die-sinking, forging and finishing departments. The great pressure on their facilities had obliged them not only to add much new machinery, but to increase the ground space occupied. Orders are under way for several of the largest railroad systems in the country. The Brock chain wrenches made by them have been recently improved, and are sent to all parts of the world. Further important additions to their plant are contemplated, to make room for the new specialties recently introduced by them.

The Lansing Wheelbarrow Co., Lansing, Mich., will soon begin the erection of a large addition to its present works for a new department for the manufacture of steel barrows and warehouse trucks.

Last week the Union Switch & Signal Co., of Pittsburgh, shipped a 72-lever machine to Jersey City, to be used at the terminus of the Central of New Jersey.

The Boston & Albany has recently been testing the new combined steam trap and reducing valve just placed on the market by the Mason Regulator Co., of Boston. The tests have been very satisfactory.

Iron and Steel.

The Lloyd Booth Co., proprietors of the Falcon Foundry and Machine Works, at Youngstown, O., shipped last month to the New Albany Forge & Rolling Mill Co., New Albany, Ind., one complete 10-in. guide train, and to the Knoxville Iron Co., of Knoxville, Tenn., one rotary squeezer. They have also just completed for the Minnesota Car Co., Duluth, Minn., one 18-in. bar mill, including the extra rolls for same, one No. 1 lever shear and five cranes, and have now under way for Chicago mills the following: 10-in., 12-in. and 18 in. roll trains; 5 lever shears, with engines attached; 4 busheling furnaces, 1 rotary squeezer, 1 roll lathe, etc.

Work has been commenced on the new plant of the Union Drawn Steel Co. at Beaver Falls, Pa. The company will manufacture cold-drawn steel, iron and other metals by patented processes and machinery fully controlled by them. The capital stock is $100,000. The building will be 50 × 200 ft., and iron-clad. The following are the officers: President, H. W. Hartman, Beaver Falls; Secretary and Treasurer, William Anderton, Beaver Falls; Superintendent, W. A. McCool.

The rolling mill at Douglassville, Berks County, Pa., will resume operations after an idleness of four months. The works employ about 100 men.

The Plymouth Rolling Mill Co., of Conshohocken, Pa., has made an assignment for the benefit of creditors. When running on full time the company employed about 125 men. The company also operated a furnace until a few months ago, when it suspended operations to make repairs. The company was organized in 1882, with a capital of $50,000.

The employés of the Crane Iron Works, at Catasauqua, Pa., have decided to accept the 10 per cent. reduction in wages, and the threatened strike did not take place. No trouble exists at the beam mill of the Allentown Rolling Mill Co., where the wages of employés were also reduced. The mill has been shut down for repairs at the rolls.

The Troy Steel & Iron Co. has completed an experiment in making soft steel, under a process invented by C. W. Bildt, Chief Chemist for Washburn & Moen, of Worcester, Mass. The experiment, it is stated, was a success. This quality of steel has heretofore been imported from Germany. The question of cost of manufacture is to be determined, to ascertain if the steel can be made here to compete with the imported article.

The Terre Haute Iron & Nail Works, Terre Haute, Ind., have about completed two Smith gas heating furnaces, with working hearths 7 by 16 ft., together with gas-producers, etc., plans for which were furnished by A. Laughlin & Co., of Cleveland, O. The gas producers are divided into four independent batteries connecting with one main flue by means of independent flues. The latter are provided with gas-tight dampers, thus allowing any battery of producers to be cleaned without inconveniencing the furnaces from shortage of gas.

The Leechburg Foundry & Machine Co., of Pittsburgh, whose works are at Leechburg, Pa., has received an order from the Troy Steel & Iron Co., of Troy, N. Y., to furnish that company with ingot molds for its Bessemer steel plant. The company has also received a large order from the Reading Nut & Bolt Co., of Reading, Pa., for rolls.

The Central Iron & Steel Co., of Brazil, Ind., will soon have ready for operation a small addition to its plant for the manufacture of railroad spikes.

The Rail Market.

Steel Rails.—Inquiries for about 20,000 tons are in the market, chiefly for Southern delivery, but beyond small sales little business has been done in the East. The April report of the Board of Control shows aggregate sales of 670,160 tons out of a total allotment of 990,850 tons. Last year, up to the same time, the sales were 658,513 tons, and in the year 1887 1,494,384 tons. The shipments for the first quarter in 1889 were 244,765 tons, against 184,580 tons in 1888 and 389,532 tons in 1887. Quotations are: in the East, $27@$27.50; at Chicago, $30@$30.50; and at Pittsburgh, $26.50@$27.50.

Old Rails.—A lot of 5,000 tons of double heads has been sold in the East at private terms. The market is weak, with little business. In the East $22.50 is quoted; at Chicago quotations have declined, sales being made at $20.25 and $19.75; at Pittsburgh American tees are quoted at $22.75@$23, and old steel rails at $17.50 and at $19@$20 for different lengths.

Track Fastenings.—In the East spikes sell at $1.95@$2, and angle bars $1.75@$1.80.

A New Lake Steamer.

The steel steamship "Cayuga," built at the Globe Iron Works, in Cleveland, for the Lehigh Valley Railroad, was launched recently. She cost $250,000 and measures as follows: Keel, 292 ft. 2 in.; over all, 308 ft. 8 in.; beam, 40 ft.; molded hold, 25 ft. 6 in. Her engine is triple expansion; cylinders, 24, 38 and 61 in., with a 42-in. stroke. The "Cayuga's" carrying capacity is estimated at 2,650 net tons on a 15½-ft. draft, or about 3,000 net tons on a 16½-ft. draft. Her speed is figured at 14 miles per hour.

Compound Locomotives in Saxony.

The state railroads of Saxony, on which compound locomotives were first tried in 1884, now have 11 compound freight engines and 7 express locomotives, to which will shortly be added another express engine, 4 freight and 3 passenger engines. The economy in fuel effected by the adoption of the compound principle is placed at fully 20 per cent. The records showing this result were carefully kept over long periods. As to cost of maintenance and repairs the engines also are reported to have given very satisfactory results, comparing favorably in every way with the ordinary types on the lines. It is even expected that they will develop a superior showing.

Rusting of Rails in Tunnels.

M. Savioz, chemist of the St. Nazaire works, France, recently completed an interesting series of experiments on the rusting of steel. The method followed consisted in exposing the metal to the action of acid waters, and observing the reduction of weights. The results showed throughout that the proportion of phosphorus present exerted an appreciable influence on the behavior of the metal. Since rails in long tunnels are undoubtedly exposed to the action of dilute sulphuric acid, the phosphorus percentage may be accepted as one of the causes of their rapid oxidation, and Savioz's re-

searches are accordingly noteworthy. The *Organ fur die Fortschritte des Eisenbahnwesen* publishes two tables giving the results obtained by him. One set of tests was made with Bessemer and Siemens-Martin steel sheets of varying thickness and chemical composition, and the other with test pieces of similar material, two pieces being taken from each ingot, one from the upper and one from the lower end. The figures show that the influence of carbon and manganese on the rusting tendency is slight, a variation of carbon of from 0.18 to 1.10 per cent., and of manganese from 0.26 to 1.15 per cent., the proportions of sulphur, phosphorus and silicon remaining the same, showing no appreciable difference in behavior of the samples. With increasing percentages of phosphorus, on the other hand, a decided tendency to oxidation was observed. The small number of tests, however, did not admit of the formulation of any law. The tests showed, further, that samples from the upper ends of the ingots were more readily attacked than those from the lower ends, and that wrought iron, with which also some comparisons were instituted, was less affected than steel with 0.17 per cent. of phosphorus, but considerably more than steel samples ranging in phosphorus between 0.05 and 0.08 per cent. The tests, we should add, were made with a mixture consisting of one part of hydrochloric acid to five parts of water, and extended over 24 hours each.

The Burgenstock Electric Cable Road.

The electric cable road which has been built on the Bürgenstock, near Luzerne, Switzerland, presents a number of interesting features. The Bürgenstock, or Bürgenberg, as it is also called, lies between the Rigi and the Pilatus, and rises abruptly out of the Vierwaldstätter Lake to a height of about 3,000 ft. The road, it appears, was built specially for the accommodation of the guests of the Hotel Bürgenstock, which stands on the brow of the hill, establishing, as it does, the shortest possible connection with the lake. Its horizontal portion is about 2,700 ft. long, while the inclined section measures nearly 5,000 ft. There is a single track, with a turnout in the middle of its length.

The rope-driving motor is located in the upper station, and the speed of rope travel is about 3¼ ft. per second. Power is furnished by a turbine rated to develop between 120 to 156 H. P., and is transmitted electrically to the station over a distance of about 2½ miles. Two pairs of dynamos are used, one, however, being sufficient to work the road. A portion of the power, probably 30 H. P., is used for the electric lighting of the hotel. During the time that no cars are run on the road the power is used for pumping water, the water-works being located some 2,000 ft. from the station.

A Long Run on the Chicago & Northwestern.

On April 8 a special train of 4 Wagner palace cars, in which Dr. Webb, President of the Wagner Company, is traveling across the continent, was taken from Chicago to Council Bluffs by a single locomotive. The distance is 490 miles, and the run was made 12½ hours. The locomotive was built at the Chicago & Northwestern shops in 1884. It has 18 by 24 in. cylinders and 63 in. drivers and a 52 in. boiler. The weight on the drivers is 59,850 lbs. The run from Chicago to Clinton, Ia., 138 miles, was made at an average speed of 39 miles an hour, including stops. The whole run of 490 miles was made at a rate of 39 2 miles per hour, stops included. Eighteen stops were made, and it is stated that the average speed in motion was about 42 miles an hour. At the end of the run the engineer, O'Neil, telegraphed back to Chicago that his engine was ready to start on the return trip at any minute.

Compressed Air for Power Hammer.

The Eames Vacuum Brake Co., in their new forge shops at Watertown, run their hammers entirely by compressed air. The air is compressed by water-power. It is said that they find not only economy, but greater efficiency, in the use of air for this purpose than with steam. The air pressure is kept at about 80 lbs. to the square inch, but if any specially heavy work is required it is quickly brought up to 100 lbs. The action is very quick and sharp, as the free exhaust causes no back pressure, and they are enabled to do with their largest hammer (10×28 in.) work that would require a larger steam hammer, using steam at the customary pressure. The compressor is placed in a separate building near the water-wheel. A reservoir is placed near the compressor to take the water of condensation and another one is connected overhead with the hammers in the forge shop. Compressed air is also used for various purposes in the machine shop of the company. By the use of this compressed air in the hammer all trouble from condensation, which must be present to some degree with steam hammers, is avoided, and the shops are kept cooler without the heat radiated from the steam boiler, pipes and cylinders.

New Bridges on the Lake Shore.

The Lake Shore & Michigan Southern is making extensive improvements to its road-bed. In addition to reducing grades the bridges have received extensive repairs. The following new bridges have been lately completed or are now under way:

Location.	Single or Double Track.	Kind of Bridge.	Material.	Spans. Number.	Spans. Length of Each.
Irving, N. Y....	Double	Pratt Truss	Iron	3	148 ft.
Ashtabula, O...	"	" "	"	1	70 "
Willoughby, O..	"	" "	"	2	80 "
Vermillion, O...	"	" "	"	1	144 "
	"	Plate Girders	"	4	65 "
Huron, O.....	Single	Draw	"	0	144 "
Port Clinton, O.	Double	"	Steel	0	180 "
Fremont, O.....	Single	Pratt Truss	Iron	1	80 "
Millbury, O.....	"	Plate Girders	"	6	20 "
Kinsman, O.....	"	Pratt Truss	"	1	148 "

The Vestibule Patents.

Judge Gresham has delivered an opinion, Judge Blodgett concurring, in the case of the Pullman Palace Car Co. against the Wagner Palace Car Co., in the United States Circuit Court, at Chicago, declaring the Pullman-Sessions patent for vestibuled cars valid, and that the Wagner Co. was infringing it. The Sessions patent covers the iron face plates under spring pressure. The court made the temporary injunction against the Wagner Co. perpetual and referred the matter of damages to a Master in Chancery to take testimony.

Progress with the Mannesmann Pipe Making Process.

At the Mannesmann Pipe Works at Remscheid-Bliedinghausen, Germany, the Mannesmann process of making pipes from solid bars, which we described at length Oct. 14, 1887, has thus far been applied in manufacturing on a large scale pipes ranging from 0.8 to 8¼ in. in outside diameter and up to nearly 20 ft. in length. Pipes of smaller diameter have also been turned out, but have not been placed upon the market owing to the demand for the larger sizes. Pipes of a larger outside diameter than 8¼ in. have not yet been made simply because of lack of power at the works. In general, it has been found that with increasing sizes the commercial advantages of the process become more apparent, there being no special mechanical difficulties in manufacturing the larger pipes, while the high speed of rolling, which remains the same for all sizes, makes a larger output possible when handling the large diameters without increasing the working cost. As to the speed with which pipe can be turned out, we find it stated that with the improved apparatus, a 4-in. pipe from 16 to 20 ft. long, with walls ¼ in. thick, can be rolled from a solid bar in about half a minute. Pipes of this diameter are being turned out at the works for high-pressure water service. They are intended for a pressure of 50 atmospheres and are tested up to 150 atmospheres. The available machinery at the works is at present employed on contracts which it will take from four to six months to carry out, running day and night.

THE SCRAP HEAP.

Notes.

A London banker and a merchant from Foochow, China, were recently taken from Omaha to Cheyenne in a special train, to enable them to overtake the Golden Gate Special, and thus connect with the steamer "Arabic" at San Francisco, thereby saving three weeks in a journey to Hong Kong. They paid $600 for their train, and were carried 123 miles in 125 minutes.

The New York and Chicago limited train has narrowly escaped wrecking near Canton, O., twice within the past fortnight. Obstructions were placed upon the track by unknown miscreants. In the second instance an employé who accidentally discovered the obstruction succeeded in slackening the train only by waving a burning newspaper at the engineer.

On Thursday of last week a man jumped into the Kentucky River from the Cincinnati Southern bridge over that stream, which is 276 ft. high. The man coughed blood for a little while but soon said he was all right.

The Cincinnati, New Orleans & Texas Pacific road has given $4,000 to a new hospital in Chattanooga, and the Baroness Erlanger has given $5,000 more.

A private letter received in New York states that four men implicated in the malicious derailment of a train in which President Diaz, of Mexico, was riding a few weeks ago, have been captured and shot.

A dispatch from Salt Lake states that four men, who robbed an Atlantic & Pacific train in Cañon Diablo, Ariz., March 21, were captured by officers after a horseback chase of 600 miles.

The Pennsylvania Co. (west of Pittsburgh) is to have a Relief Association like that now in operation on the Pennsylvania road proper. It will be established about the middle of July.

The changing of division freight runs on the Chicago, Burlington & Quincy, by which Burlington becomes a way station, will involve the discontinuance of large stock yards there. The retrenchment policy of the road also includes the abolition of the pay-car, and the statistical department of the auditor's office has been closed, throwing 70 clerks out of employment.

The division watch inspectors of the Louisville & Nashville have recommended the employés to provide themselves with anti-magnetic shields, and have agreed upon the following grades of watches as the lowest which they will approve in cases where new watches are bought. Those manufactured by the Elgin National Watch Co. must be of the B. W. Raymond movement and upward; watches of the American Waltham Watch Co. must be of grade No. 35 and upward; of the Illinois Watch Co. the Bunn movement and upward; of the Hampden Watch Co., the Perry movement and upward; of the Columbus Watch Co., No. 27 and upward; of the E. Howard Watch & Clock Co., all grades of the new model movements; of the Aurora, Rockford and other makes, no grades lower than those given above

The Supreme Court of South Carolina has decided that township bonds voted and issued by townships in the several counties of that State, in aid of the construction of the Charleston, Cincinnati & Chicago and other railroads are valid. This decision gives these bonds the same legal status as county bonds. It was discovered last fall that about $1,000,000 of township bonds were invalid by reason of technical defects in the action taken by the townships. It is now stated that work will be at once resumed on a number of lines whose construction was suspended at that time.

The Secretary of the Interior has requested the Attorney-General to suspend all action, either civil or criminal, against the Northern Pacific Railroad for timber trespass on the public lands in Montana until the same can be investigated, with a view to their dismissal. This action is taken, it is understood, upon information that it would be extremely difficult, if not altogether impossible, for the government at this late day to secure sufficient evidence to maintain these suits.

The trials of the Burlington dynamite conspirators, at Geneva, Ill., have been concluded. Broderick is sentenced to a year in the Joliet state prison and Godding is fined $500.

The freight brakemen of the Atlantic & Pacific, running between Winslow and Mojave, Cal., have struck because the company refused to allow three men to each train.

The Pennsylvania Railroad's ferryboat "New Brunswick" was burned April 17, just as she was leaving her slip at Jersey City, N. J. The passengers all got off safely with the exception of one man, who was knocked down by the excited crowd and sustained a broken leg. The vessel was valued at $65,000.

A French railroad, which has telephone communication between its stations, provides telephones, battery and wire for its trains thus enabling the conductor to establish communication in case of a break-down between stations. This is a step better than the use of telegraphic instruments, as is the case on some American roads, as all train men can make use of telephones without much instruction. In France, as in Germany, telephones may be bought outright, we believe.

A Congo Railroad.

M. Vauthiers, the engineer of the Congo Co., proposes the construction of a railroad in Africa, starting from Matadi, opposite Vivi, and ending at Stanley Pool. The distance is 425 kilometres, and it is reported that the road can easily be constructed.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

The Supreme Court of North Carolina rules that a municipal ordinance imposing a tax of a specified amount on every railroad company running its road through the corporate limits, when imposed under legislative authority, is valid. Such tax does not interfere with inter-state commerce as to a railroad extending into another state, nor is it violative of the principle of uniform taxation.[1]

In Georgia the Supreme Court holds that the dominion of a railroad corporation over its trains, tracks and "right of way" is no less complete or exclusive than that which every owner has over its own property. Hence the corporation may exclude whom it pleases, when they come to transact their own private business with passengers or third persons, and admit whom it pleases, when they come to transact such business. This applies to selling lunches or to soliciting orders from passengers for the sale of lunches.[2]

In Iowa the Supreme Court holds that in the absence of any statute or anything in the articles of incorporation of a railroad company providing that the company shall not begin business until all its required capital stock shall be subscribed, the company is authorized to begin business as soon as its articles of incorporation are filed in the recorder's office. The failure of a railroad company to perform its part of a contract as to the time of the completion of its road will not release stockholders from their subscription. Where a railroad company expends large sums in the construction of a railroad, tax-payers, having before the completion of the road made no objection, are estopped to deny the validity of the tax.[3]

In Nebraska the Supreme Court holds that a bridge across the Missouri River is not taxable as "road-bed right of way or superstructure thereon."[4]

In Ohio a railroad employed a construction company to build some of its track, agreeing to issue bonds therefor to a certain amount per mile of track, in installments, as sections of the work should be completed. By a subsequent agreement the bonds were delivered in advance of the building of the track, the construction company agreeing to take care of and pay all interest accruing before the railroad became in condition for traffic, and the former agreed to reimburse the latter for all interest paid, not properly chargeable to it, out of the first earnings of the road. The Federal Court rules that the construction company was only bound to pay interest on so many of the bonds as it received and used to which it was not entitled under the construction contract. The agreement of the construction company to pay the interest is no defense to a bill for foreclosure of a mortgage to secure said bonds and coupons, brought by the trustees in the mortgage at the instance of a corporation to whom the bonds were negotiated.[5]

In Illinois the Federal Court holds that where both before and during a receivership of the property of a railroad corporation pending mortgage foreclosure, moneys from current receipts are expended for improvements and equipment, a claim for rent of cars may be charged on the income during the receivership, and, if that is inadequate, upon the proceeds of the mortgaged property.[6]

The Supreme Court of Texas decides that under the state constitution prohibiting railroad corporations from controlling competing or parallel lines, an agreement forming a traffic association between a number of such corporations for the purpose of "preventing sudden and extreme changes in Texas rates," by which a managing committee is authorized to fix freight rates, no member being allowed to reduce them, is illegal, though a unanimous vote is required to establish the rates, which may be reduced as provided by the agreement, and though punishment is provided for violating the agreement, and any member is at liberty to withdraw upon notice. Said constitutional provision is not void for assuming to regulate inter-state commerce when applied to the agreement in question, though some of the traffic embraced therein is partly without the state, and some of the parties to the agreement, being corporations created under the laws of Texas, the agreement as to them is illegal, and is therefore illegal as to all. The enforcement of such an agreement may be restrained, though no charges in excess of the rates permitted by law have yet been made, as the illegality is in the agreement itself.[7]

Injuries to Passengers, Employes and Strangers.

In Georgia the Supreme Court lays it down that if a disorderly passenger defies the conductor, draws a pistol, and thereby induces the conductor to arm in order to expel him from the train, and if after expulsion he still uses grossly obscene and profane language, reeking with insult, on which a mutual combat with pistols ensues, the railroad company is not liable for the consequences, though the expelled passenger be wounded in the conflict, even if the conductor, excited by danger and irritated by insult, be not fully excusable for the shooting.[8]

In a North Carolina case the plaintiff and a fellow passenger testified that they were riding in a caboose on a freight train, and that, the train having stalled and come to a stop, plaintiff attempted to pick up an overcoat from the floor, when the car was suddenly struck a very hard blow, causing him to fall and receive the injury, and that when the car stalled it made two or three attempts to move and then eased back and stopped. The Supreme Court holds that the Court properly refused to instruct the jury that there was no evidence of overloading, or negligent management, or that the injury was the result of a mere accident.[9]

In Wisconsin a female passenger on a regular train was ordered by the conductor to leave the train at a point several hundred feet from the station, and thus compelled to walk along a side track crossing a highway on an open culvert. Owing to the darkness, she fell into the culvert, receiving some injuries, and was frightened by the backing of trains on the track towards her while attempting to extricate herself. The Supreme Court rules that she was entitled to recover for the fright sustained, together with such other mental suffering as was the result of defendant's negligence.[10]

In Virginia one Jackson and a fellow-servant, employés of defendant railroad company, in obeying an order, adjusted a "push-pole" from the corner of a tender to the corner of a car on a parallel track, for the purpose of pushing the car, but, as the engine started, one end of the pole slipped, throwing Jackson under the wheels, whereby he was killed. The Supreme Court of Appeals holds that Jackson's representative cannot recover on the ground that defendant was negligent in not supplying the corners of the tender and car with "sockets" in which to place the pole, when plaintiff's evidence shows that such "sockets" are a new invention, not in common use; that their absence was obvious to Jackson, and that he had been in defendant's employ in the same capacity several years—the presumption being that he knew that the "sockets" were not used by the defendant when he entered its service.[11]

In Georgia the Supreme Court rules that a lessee or licensee of the exclusive privilege of entering the cars or upon the right of way to sell or supply lunches, is not a servant or agent of the railroad so as to render it liable for an assault, or an assault and battery, committed by such lessee or licensee upon a competitor who seeks lawfully, on his own premises, to obtain the patronage of passengers.[1]

In Iowa in an action for wrongful death of an engineer in

defendant's employ, the evidence showed that the accident was caused by the derailment of the engine in consequence of defects in the track; that the conductor had noticed the defects three days before, and had called the attention of the section boss to them, but that no attempt to repair had been made. The Supreme Court holds this sufficient proof that the injury resulted from defendant's negligence in permitting the defects to remain after notice.[13]

In the same state the Supreme Court decides that where the agreement under which one is employed by a railroad company, forbids him to uncouple cars while in motion, and he, having passed between stationary cars to uncouple them, remains there after the cars are wrongfully started until he is pushed into a cattle-guard, of which he knows, and is injured, he is guilty of contributory negligence in law, though he testifies that he was so absorbed in his duty that he forgot the cattle-guard, and that, knowing that the starting of a train sometimes loosens a tight car-pin, he attempted to remove the pin after the train started, and that but for this he could have stepped out and avoided the danger.[14]

In Virginia a pedestrian was killed by a locomotive while walking on the track in the railroad yard, where he knew trains were constantly being made up. He was partially intoxicated, and just before dark started from a point near the tracks, of which he had a good view, in the direction whence the engine came, to go several hundred yards distant on the other side of the tracks. He could have gone by three good routes without walking on the tracks, except once crossing them, but, after going part way, he went on the tracks and carelessly walked on one of them without looking back. Two freight trains were passing in the opposite direction at about that time, and the engine by which he was killed had stopped at a switch to wait for the passage of one of them. When it passed the engine came on slowly, ringing its bell, which deceased did not seem to hear. Others tried to warn him, and the engineer, thinking deceased would step off the tracks as others were doing, did not attempt to stop until within one and a half car lengths from him, when he used his best efforts to do so. The Supreme Court of Appeals rules that the man was negligent and the railroad was not responsible for his death.[15]

In Georgia, the Supreme Court rules that under a statute requiring an engineer, on reaching a blow-post, to blow the whistle and check the train, so that it may be stopped at the crossing, it is not necessary to begin to check the speed before reaching the post, though the track is down grade, especially where the evidence shows that the train could have been stopped before reaching the crossing.[16]

In Kansas, through an unavoidable accident, a cattle train was derailed, and, to clear away the wreck, it was necessary to release the cattle from two or three of the cars. Some of the cattle so released escaped from control, and ran over the public highway, and through adjoining fields. The railroad's claim agent, whose duty it was to look after the cattle and see that they were returned to the company for reloading, was present at the wreck. He instructed the section foreman to get some men to collect the cattle together and reload them. The foreman employed a young man to assist in rounding up and driving back the cattle, and told him to get a horse, if he had one, to aid in their work. The young man took the horse of his father, without the latter's knowledge or consent, and used the same in collecting and driving back the cattle to the cars. While being used in the service of the company, the horse was severely gored and injured by one of the cattle. The Supreme Court decides that as the section foreman and young man were acting in the company's business, although in taking and using the horse they were beyond their instructions, the company is liable for the damages to the horse.[17]

[1] R. & D. R. Co. v. Reidsville, 8 S. E. Rep., 124.
[2] Fluker v. Geo. R. & B. Co., 8 S. E. Rep., 529.
[3] Johnson v. Kessler, 41 N.W. Rep., 57.
[4] Cass Co. v. C., B. & Q. R. Co., 41 N.W. Rep., 246.
[5] Foster v. M. C. L. & M. R. C., 36 Fed. Rep., 627.
[6] Thomas v. P. & R. I. R. Co., 36 Fed. Rep., 808.
[7] Gulf, C. & S. F. R. Co. v. State, 19 S. W. Rep., 81.
[8] Penny v. Geo. R. Co., 8 S. E. Rep., 70.
[9] Wallace v. West. R. Co., 8 S. E. Rep., 166.
[10] Stutz v. C. & N. W. R. Co., 40 N. W. Rep., 683.
[11] N. & W. R. Co. v. Jackson, 8 S. E. Rep., 370.
[12] Fluker v. Geo. R. & B. Co. 8 S. E. Rep., 529.
[13] Worden v. H. & S. R. Co., 41 N. W. Rep., 26.
[14] Sedgwick v. Ill. Cent. R. Co. 41. N. W. Rep., 35.
[15] N. & W. R. Co. v. Harman, 8 S. E. Rep., 251.
[16] Crawley v. Geo. R. Co., 8 S. E. Rep., 417.
[17] A., T. & S. F. R. Co. v. Randall, 19 Pac. Rep., 783.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

St. Paul, Minneapolis & Manitoba, quarterly, 1½ per cent., payable May 1.

Wheeling & Lake Erie, quarterly, 1 per cent. on the preferred stock, payable May 15

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atchison, Topeka & Santa Fe, annual meeting, Topeka, Kan., May 9.

Cairo, Vincennes & Chicago, special meeting, Cairo, Ill., April 25.

Chicago, Burlington & Quincy, annual meeting, Chicago, Ill., May 15.

Cincinnati, Indianapolis, St. Louis & Chicago, special meeting, Indianapolis, Ind., May 15, to consider the agreement for consolidation with the Cleveland, Columbus, Cincinati & Indianapolis, and the Indianapolis & St. Louis roads.

Cleveland, Columbus, Cincinnati & Indianapolis, special meeting, Cleveland, Ohio, May 15.

Lake Shore & Michigan Southern, annual meeting, Cleveland, O., May 1.

Louisville, Evansville & St. Louis, special meeting, Mt. Vernon, Ill., May 20.

Michigan Central, annual meeting, Detroit, Mich., May 2.

Missouri, Kansas & Texas, annual meeting, Parsons, Kan., May 15.

Steinway & Hunter's Point, annual meeting, New York City, April 26.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Railway Master Mechanics' Association* will hold its next annual convention at Niagara Falls, beginning Tuesday, June 18, with headquarters at the International Hotel. All who wish to secure rooms should apply to Mr. A. H. Gluck, Manager, International Hotel, Niagara Falls, N. Y.

The *Master Car-Builders' Association* will hold its next annual convention at Saratoga Springs, N. Y., June 25. Hotel accomodations may be secured by applying to H. S. Clement, Manager Congress Hall.

The *Train Dispatchers' Association* will hold its second annual convention in Indianapolis, Ind., June 12. E. J. Peabody, 237 Franklin street, Chicago, is Secretary.

The Association of American Railway Accounting Officers will hold its next meeting at Niagara Falls, N. Y., in July.

The Traveling Passenger Agents' Association will hold its next meeting in Plank's Hotel, Mackinac Island, Mich., July 9.

The Roadmasters' Association of America will hold its seventh annual convention at Denver, Colo., Sept. 10.

The New England Roadmasters' Association will hold its next meeting in Boston, August 21.

The American Association of General Passenger and Ticket Agents will hold its next semi-annual meeting in Atlanta, Ga., Sept. 17.

The National Association of General Baggage Agents will hold its next meeting at Detroit, Mich., July 17.

The *National Association of Railway Surgeons* holds its annual convention in St Louis, Mo., May 2, 1889.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street New York.

The *Boston Society of Civil Engineers* holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Gerard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7.30 p. m. at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m. on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Mr. Forney's Resignation of the M. C. B. Secretaryship.

The resignation of Mr. Forney has already been announced in this journal, but his many friends and all members of the M. C. B. Association will be interested in the following letter which is now given out for publication:

NEW YORK, March 14, 1889.

To the Members of the Executive Committee of the Master Car Builders' Association:

GENTLEMEN: As other interests demand all of my time and attention, I have decided that I will not accept a reappointment as Secretary of the Master Car-Builders' Association, should it be tendered to me after the next annual convention. As the business of last year has all been completed, and little or none of that for the current year has yet been begun, it seems to be desirable if a new incumbent of the office is appointed, that he should assume its duties before, rather than after, the convention, so that he will become familiar with the business which will be transacted during the meeting, which must be embodied in the annual report for the current year.

For these reasons I hereby request the executive committee to relieve me of the office and duties of Secretary of the Association at as early a date as it may be possible to agree upon my successor.

In relinquishing my official relations to the Association, I feel sure that it will be a pleasure to me hereafter to remember the acquaintances and friendships which have been made during the time that I have occupied the position of secretary, and to recall the period and the experience of my term of office.

Trusting that the pleasant personal relations of the past will be continued, and that the prosperity and usefulness of the Association may increase in the future as it has in the years that are left behind us, I am yours very respectfully,

(Signed) M. N. FORNEY.

New England Railroad Club.

A regular monthly meeting was held Wednesday, April 10, President Richards in the chair. The subjects for discussion for the next monthly meeting are: "The Rules for Interchange of Freight Cars" and the "Desirability of Increasing the Size of Car Axles." A vote of thanks was passed to Mr. Lauder for his efficient services as President of the Club for the past two years. The subject of discussion for the evening was "Compound Locomotives," and an abstract of the paper read and of the discussion ensuing will be found on another page of this issue.

PERSONAL.

—Mr. T. H. Leavitt, Auditor of the land department of the Burlington & Missouri River road, has tendered his resignation, to take effect at the close of this month.

—Mr. D. P. Eells, President of the Calumet Iron & Steel Co., has resigned his position on account of the pressure of other duties, and Charles Himrod has been chosen to succeed him.

—The friends of Mr. Thomas B. Inness, of No. 115 Broadway, New York, will regret to learn that his wife died at her home in Morristown, N. J., on April 7. Mrs. Inness was buried in Pottsville, Pa., on April 10. She had been an invalid for nearly a year.

—Mr. C. W. Lanpher, Superintennent of Transportation of the New York, Ontario & Western, has been granted a two years' leave of absence for travel in Europe for the benefit of his health and in the interests of the company. His place will be filled during his absence by C. H. Hopkins, Chief Train Dispatcher.

—Mr. Lucius Tuttle, since January, 1887, Passenger Traffic Manager of the Canadian Pacific, will succeed Mr. Pierson as Commissioner. Previous to his connection with the Canadian Pacific, Mr. Tuttle was General Passenger and Ticket Agent of the Boston & Lowell, and has also held responsible positions in the passenger department of several other New England roads.

—Mr. Charles A. Cairns, who, after 10 years' service with the Cleveland, Columbus, Cincinnati & Indianapolis, has resigned his position as Chief Clerk in the Passenger Department of that road to accept a similar position on the Chicago, St Paul & Kansas City, was presented with a handsome gold watch by General Passenger Agent D. B Martin, on behalf of the passenger department of the line. Mr. Cairns is editor of the *Bee Line Gazette*.

—Mr. Charles F. Hatch, President of the Wisconsin, Minnesota & Pacific, operated by the Minneapolis & St. Louis, shot himself in his office in Minneapolis, April 15. The cause which prompted the deed is unknown. Mr. Hatch at various times was General Superintendent of the Lake Shore & Michigan Southern, General Manager of the Eastern road and of the Minneapolis & St. Louis, and General Superintendent of the Chicago, St. Paul, Minneapolis & Omaha.

—Mr. Samuel F. Pierson, after a service of about three years as Commissioner of the Passenger Department of the Trunk Line Association, has resigned that position. Mr. Pierson entered the office of the General Ticket Agent of what is now the Cleveland, Columbus, Cincinnati & Indianapolis, and remained with that company for 19 years, serving as General Ticket Agent and as General Passenger Agent of the Indianapolis & St. Louis. In June, 1880, he became Commissioner of the Colorado Pool, and in March, 1883, he was chosen Assistant Commissioner of the Trunk Line Executive Committe.

—Col. Richard Long, well known in railroad circles, died at Pittsburgh, Pa., on Wednesday, April 10, from injuries received while crossing the Pittsburgh & Fort Wayne tracks at Allegheny City, on April 4. Colonel Long was hurrying to meet an appointment with Mr. James K. Verner, Secretary of the Pittsburgh Forge & Iron Co., at the railroad station, and in making a short cut found it necessary to cross the tracks of the Allegheny Valley and Pittsburgh & Fort Wayne roads. In avoiding the trains on the former tracks, he did not observe a freight train which was coming toward him on the other, the engine of which was backing. In his haste he stumbled and fell upon the track almost in front of the engine. He was physically helpless for a moment, and was unobserved by the engineer until the tender had run over his right arm above the wrist and his right foot. The side of his head was also badly bruised. Colonel Long survived his injuries for a week. His funeral was held on Friday, April 12, at Chillicothe, Ohio, his former home. He was 51 years of age.

ELECTIONS AND APPOINTMENTS.

Allegheny Valley.—At a meeting of the Board of Managers of the company, in Philadelphia, last week, Henry D. Welsh, of Philadelphia, was elected President, to succeed the late John Scott.

Atlantic Coast Line.—E. Borden has been appointed Assistant Superintendent of Transportation of the Wilmington, Charleston and Columbia Divisions, vice J. R. Nolan, resigned. His office will be at Wilmington, N. C.

Burlington & Missouri River.—C. D. Dorman, General Auditor, has resigned on account of ill health, and J. G. Taylor, Assistant Treasurer, has been appointed to succeed him, in addition to his other duties.

Central of New Jersey.—G. De Witt Smith has been appointed Purchasing Agent of this company, succeeding A. Reckless, deceased. His office will be at 119 Liberty street, New York.

Central Valley.—At the annual meeting held last week at Louisville, the following directors were elected: A. T. Keightley, Greencastle, Ind.; L. A. Weakly, Shelbyville, Ky.; John W. Lee, Bedford, Ky., and J. D. Shouse, Sulphur, Ky. A. T. Keightley was chosen President.

Chicago & Alton.—F. W. Bridges has been appointed Car Accountant, with office at Bloomington, Ill., vice H. H. Lyon, resigned.

Chicago, Hannibal & Springfield.—The following are the incorporators named in the Illinois charter: R. C. Nickerson, M. M. Jamieson, B. H. Fudge, George B. Lathrop and Joseph Lathrop. The principal office will be at Chicago.

Chicago, Kansas & Nebraska.—The car accounts of the road will be removed to Chicago May 1, and all reports, etc., after that date are to be sent to C. F. Drew, Car Service Agent of the Chicago, Rock Island & Pacific.

Chicago, Rock Island & Pacific.—A. Kimball, Assistant to the President, will have charge of construction and maintenance of roadway, bridges, etc., on lines between the Mississippi and Missouri rivers; also the Leavenworth terminals and the Rock Island bridge. His headquarters will be at Davenport, Ia. H. A. Parker, Assistant to the President, will perform similar duties on the lines in Illinois and west of the Missouri River, except the Leavenworth terminals. His headquarters will be in Chicago.

Chicago, St. Paul & Kansas City.—The following appointments have been announced: J. C. Freeman having resigned, the position of Commercial Agent at St. Joseph, Mo., has been abolished, and C. R. Berry has been appointed General Agent, in connection with his other duties at that point. J. S. Christian has been appointed Commmercial Agent, with headquarters at Kansas City, Mo. E. J. Carter has been appointed General Agent in Montana and Idaho, with headquarters at Helena. P. J. Pheeney having resigned, the division freight and passenger agency at Des Moines has been abolished. A. F. Ingalls has been promoted to the new position of Commercial Agent, with headquarters at Des Moines, Ia. W. S. Hineline having resigned, the position of General Agent at Chicago has been abolished, and C. B. Gregory has been promoted to the new position of Commercial Agent, with headquarters at No. 204 Clark street, Chicago.

Chicago, Santa Fe & California.—C. W. Ryus, for several years connected with the claim department of the system, has been appointed Claim Agent of the line with headquarters at Chicago.

Cincinnati, Lebanon & Northern.—The stockholders of the company have re-elected the old directors as follows: Geo. Hafer, A. D. Bullock, A. S. Winslow, E. I. Browne, Briggs Swift, J. N. Kinney and J. M. W. Neff.

Citizens'.—The incorporators of this new Delaware company are as follows: John W. Hall, Dr. Henry Ridgely,

E. H. Bancroft, W. E. Ellison, Alfred L. Hudson, John J. Rosa, Robert H. Davis, George H. Draper, James A. Hopkins, William B. Tomlinson, Charles T. Pepper, Thomas F. Dilworth, William R. Cochran, Daniel W. Corbit and Serick F. Shallcross.

Goshen & Deckertown.—At the annual meeting of the company, held in Goshen, N. Y., last week, the following officers were elected: Geo. W. Murray, President; G. A. Denniston, Jr., Treasurer; Robert Young, Stewart Young, Curtice M. Vail, Geo. S. Vail, W. W. Gibbs, I. C. Stanton, A. B. Post, G. W. Murray, Chauncey Hulse, Geo. Grier, G. A. Denniston, Jr., Lewis Wilcox, Daniel Bailey, Directors.

Grand Tower & Cape Girardeau.—The stockholders have elected the following directors: E. A. Hitchcock, F. F. Wheeler, J. D. Peters, B. B. Bromley and W. W. Barr. The officers are: President, E. A. Hitchcock, St. Louis; Vice-President, F. F. Wheeler, Cape Girardeau, Mo.; Secretary, J. D. Peters, Carbondale, Ill.; Treasurer, O. L. Garrison, St. Louis.

Indianapolis, Decatur & Western.—A. J. Diddle having resigned, Joseph McKeown has been appointed Roadmaster, with office at Indianapolis.

Lake Superior Terminal.—The following are the incorporators of this Minnesota company: Joseph Sellwood, James B. Geggie, James T. Hale, Thomas J. Davis and John P. Morrow, all of Duluth.

Lexington Belt.—The company has been organized with the following officers: President, Leslie Combs; Vice-President, John R Allen; Treasurer, R. P. Stoll; Secretary, J. E. Keller. The following Board of Directors has also been chosen: J. H. Shropshire, Alex. Pearson, John T. Shelby, H. C. McDowell, W. J. Loughridge, John R. Allen, Leslie Combs, R. P. Stoll, Asa Dodge, J. E. Keller and C. H. Stoll.

Louisville, Evansville & St. Louis Air Line.—D. J. Mackey, who recently secured control of the road, has been elected President, vice W. T. Hart, resigned. His office will be at Evansville, Ind.

Marietta & North Georgia.—At a meeting of the directors of the road at Atlanta, Ga., this week, Francis Kendall, of Boston, was elected treasurer. There was no election of president.

Montana Central.—E. H. Beckler, in addition to his duties as Chief Engineer, has been appointed Superintendent, with headquarters at Helena, and he will have charge of station and transportation service and maintenance of road and structures.

Monterey & Mexican Gulf.—J. A. Robertson has been appointed Assistant General Manager, with office at Monterey, Mexico. Thomas F. Bullock, 42 Wall street, New York City, is Vice-President and General Manager of the line.

Mt. McGregor.—The following are the directors of this company, a reorganization of the Saratoga, Mt McGregor & Lake George: Alexander B. Vroman, John Warner, Amsterdam; William J. Arkell, A. Y. Richmond, Edward S. Smith, George W. Goertner, Canajoharie; Douglass W. Maybee, Frank Jones, John Person, Ballston, Douw H. Fonda, Chas. E. Gaus, Albany; Robert L. Sackett and W. J. Merrill, New York City.

New York Central & Hudson River.—At the annual meeting held in Albany, April 17, the following were elected directors: Cornelius Vanderbilt, Chauncey M. Depew, Charles C. Clarke, Horace J. Hayden, William K. Vanderbilt, Frederick W. Vanderbilt, Samuel F. Barger, J. P. Morgan and Cyrus W. Field, all of New York City; William Bliss, Boston; Sherman S. Jewett, Buffalo; Erastus Corning, Albany; George C. Buell, Rochester.

The West Shore and Geneva & Lyons roads re-elected the old directors.

New York, Ontario & Western.—John Burton has been appointed General Manager of the New York, Ontario & Western, and John B. Kerr, who has been Acting Manager, has resumed his duties as General Counselor. R. B. Ricard succeeds Mr. Burton as Secretary and Treasurer, and Charles A. Draper succeeds Mr. Ricard as Purchasing Agent and Paymaster.

Nickel Plate Line.—Beginning May 1, the car service accounts of the line will be in charge of C. W. Cushman, Manager Railway Car Association, Buffalo.

Phillips & Rangely.—The incorporators of the road met this week at Farmington, Me., and chose Henry P. Clossen, of Gardiner, President and Fremont E. Timberlake, of Phillips, Clerk and Treasurer.

Roanoke & Southern.—George W. Maslin has resigned as Assistant to the First Vice-President of the Baltimore & Ohio to become the Superintendent of this road, now building from Winston to Martinsville and Roanoke, Va.

Rochester & Honeoye Valley.—The following board of dis[illegible]s was elected last week: Oliver Allen, Mumford; Thos. [illegible]n and Selden S. Brown, Scottsville; John N. Beckley, [illegible]ester; Allen C. Beach, Watertown; James E. Childs, [illegible]veland; George H. Holden, Honeoye Falls; George A. [illegible]uck, George Moss, Henry D. McNaughton and Jerome Keyes, Rochester; Donald McNaughton, Mumford.

St. Paul, Minneapolis & Manitoba.—V. C. Russell has been appointed Traveling Passenger Agent for this company, with headquarters at London, Ont. H. E. Tupper, District Passenger Agent, having resigned, L. W. Campbell has been appointed General Agent, with headquarters at 232 South Clark street, Chicago. E. C. Oviatt has been appointed Traveling Passenger Agent for the Manitoba Pacific route, with headquarters at Battle Creek, Mich.

Staten Island.—The new directors have re-elected Erastus Wiman, President, and Charles Watrous, Vice-President. The announcement in our issue of April 5 of new directors being elected for the Staten Island Rapid Transit was incorrect, the directors being elected for this company.

Stewiacke Valley & Lansdowne.—The directors of this Canadian company are as follows: Hon. S. H. Holmes, President, Halifax, Nova Scotia; Geo. M. McKay, Lansdowne, Pictou County, N. S.; R. G. Leckie, Spring Hill, N. S.; Chas. Armand, Halifax; Chas. Armand, Jr., Secretary, Halifax; and Lionel H. Buck, Chief Engineer, Upper Stewiacke, N. S.

Suffolk & Carolina.—At the annual meeting of the company, held at Suffolk, Va., April 11, J. S. Gittings, Douglas Thomas, S. P. Ryland, J. Hough. Cottman, W. C. Sedden and Wm. H. Bosley were elected directors. The board elected Charles F. Pitt, Jr., President; Charles H Jones, Jr., Vice-President and General Manager; W. B. Oliver, Treasurer, and John S. Gittings, Secretary. The offices of the company are at Suffolk.

Tennessee & Alabama.—The officers are: J. L. Girton, President; M. A. Leak, Stevenson, Ala., Vice-President; H. P. Wiggs, Secretary, and W. B. Young, Treasurer.

Toledo & Chicago Air Line.—The following are now the officers of this road: M. Mercer, President; W. L. Stonex, Vice-President; W. R. Ellis, Secretary, and E. W. Hawks, Treasurer. The principal office is at Goshen, Ind.

Trunk Line Association.—Lucius Tuttle, Passenger Traffic Manager of the Canadian Pacific, has been appointed Chairman of the Passenger Committee, in place of S. F. Pierson, resigned.

Union & Northwestern.—This company has been organized at Monroe, La., by the election of the following board of directors: Uriah Millsaps, President; W. W. Heard, Vice-President; Ben Reynolds, John P. Barker, D. A. Breard, Sr., Ed. Jonas, J. Marx, F. P. Stubbs, F. Engom.

Union Rapid Transit.—William R. Raymond, David E. Shanahan and Elmer E. Robinson are incorporators of this company, which proposes to build an elevated road in Chicago.

West Shore.—At the annual meeting held this week in Albany the old board of directors was chosen.

OLD AND NEW ROADS.

Baltimore & Ohio.—At the regular meeting of the Board of Directors, a dividend of 5 per cent. was declared on the stock of the Washington Branch road for the half-year ended March 31. The Board deemed it inexpedient to declare a dividend on the common stock of the Baltimore & Ohio for the half-year ended March, 1, 1889. Mr. Gorman offered a resolution urging that it was inexpedient to discontinue the construction of engines and cars at the shops of the company. Mr. Frick offered as a substitute for Mr. Gorman's resolution a resolution stating that it was inexpedient for the board, in advance of its being furnished with the report now being prepared in reference to the condition and capacity of the works at Mount Clare, to determine upon any fixed and unchangeable policy in regard to the character of the work to be done there. The substitute was carried by a vote of 11 to 6.

Beech Creek & Hudson River.—It is expected to let contracts very soon for building this line from Newberry, Pa., near Williamsport, east to Shickshinny, Pa., on the north branch of the Susquehanna River and on the Wilkesbarre & Western Railroad. This latter line is now completed from Watsontown to Rohrsburg, Pa., a distance of 29 miles, and is to be merged with the Beech Creek & Hudson, and become part of the through line of that company. Samuel Nevins, 11 Wall street, New York, is President.

Bowers & Piney Creek.—Chartered in Texas, with a capital stock of $50,000, to build a road from Bowers to Piney Creek, about 10 miles.

Canadian Pacific.—The bill which recently passed Parliament, empowering this company to consolidate, reduces its 5 and 6 per cent. bonds to 4 per cent. without increasing fixed charges for interest now amounting to $4,365,000. The company is enabled to increase its aggregate bond issue from $87,000,000 to $109,000,000, and it also has power to raise $12,500,000 by bonding the 5,097 miles of road now operated, to the extent of $2,500 per mile.

The new short line of the Canadian Pacific through Maine to the maritime provinces of Canada, will be opened early in June by a through daily train service. The line between Montreal and St. John, N. B., will be about 300 miles shorter than the present route.

Chicago, Hannibal & Springfield.—This company, which did considerable surveying in Missouri and in Illinois last year, has filed articles of incorporation in Illinois, with a capital stock of $10,000,000, to construct a railroad from Chicago through Pike County to the Mississippi River, opposite Hannibal, Mo., passing through or into the counties of Cook, Will, Grundy, LaSalle, Livingston, Woodford, Peoria, Tazewell, Mason, Fulton, Schuyler, Brown, Adams and Pike.

Cincinnati, Hocking Valley & Huntington.—The district court at Georgetown, O., has ordered a second sale and decreed that the portion of the road west of Hillsboro could be sold for $10,000 and the east end for $5,000.

Citizens'.—This company has applied for a charter in Delaware, authorizing it to construct railroads between any points in the State of Delaware, and to construct branches from the main line to other towns or places within any county through which said road may pass. The capital stock of the company is placed at $4,000,000. The company is given power to pass over any street or road of the State. It is not to charge over three cents a mile for passengers. It must not consolidate with any other road.

Dover & Statesboro.—Joseph H. Burckhalter has the contract for grading this line, and it is expected that that part of it from Dover south to Statesboro, Ga., will be completed early next month. It is proposed to extend the road south to Waycross. F. T. Lockhart, of Augusta, Ga., is president.

Duluth & Winnipeg.—This company received a valuable land grant from the State of Minnesota, to be forfeited if the road was not completed within a certain time. The company failed to comply with the conditions accompanying the grant, but has endeavored to prevent any action being taken to declare the grant forfeited, and early during the present session of the Legislature of Minnesota, had introduced a bill to waive the claim of the State to a forfeiture of the grant. This bill failed to become a law, and another bill introduced for a similar purpose, has just been defeated in the house by a vote of 44 to 43.

Fort Worth & Rio Grande.—Roche, Hurley & Tierney, of Ft. Worth, who have the contract for grading the extension southwest from Granbury, Tex., the present terminus, to the Colorado River, 135 miles, have commenced letting sub-contracts on the line. Clearing has also been commenced, and contractors will soon be at work on the section to Stephenville.

Hartford & Connecticut Western.—It is stated that work will begin within 30 days on the proposed Springfield & Connecticut road, from Tariffville, Conn., north 18 miles to Springfield, Mass. It is stated that the company will abandon the petition to the Connecticut Legislature for authority to mortgage the existing road, the necessary funds having been secured by other means.

Houston, Central Arkansas & Northern.—The grading on this road is now completed from the junction with the Vicksburg, Shreveport & Pacific at Monroe south to the Washita River, just above Columbia, La., a distance of about 25 miles. Tracklaying on this section will soon commence. The section north of the junction has been located to Merrouge, which is in Morehouse County, west of Bastrop. The length of this line is also 25 miles, and ten miles of grading has been completed. The Reynolds & Henry Construction Co. is building the line.

Hudson Tunnel & Railway Co.—A mortgage for £550,000 has been filed in Jersey City, with the Farmers' Loan and Trust Co., of New York, as trustees, by the company, to complete the tunnel between Jersey City and New York. The bonds have been taken in London, but no definite information is given as to when the funds will be available or work be commenced.

Kansas City, Texarkana & Gulf.—It is stated that a contract for building 10 miles of this road has been let to a contractor in Texarkana, and that work on the line will soon begin. The line has been surveyed and finally located from the south bank of the Red River, near Texarkana, Tex., north to Antimony City, Ark. It is projected to extend it north to Fort Smith, Ark.

Lake Superior Terminal.—Articles of incorporation filed in Minnesota to build one or more lines of railroad along the shores of Lake Superior, Superior Bay and St. Louis Bay, in the county of St. Louis, with branches. The capital stock is fixed at $1,000,000.

Los Angeles & Hueneme.—Incorporated in California to build a road from Los Angeles, through the San Fernando Valley, via the Santa Susanna Pass and the Santa Clara Valley, to a point on the ocean near Hueneme. There will be a branch to the Southern Pacific at Saticoy or Montalvo, in Ventura County, and an extension from the western terminus into Hueneme. The length of the road will be about 70 miles and the capital stock is placed at $2,000,000, of which $70,000 is subscribed. M. C. Marble, of Los Angeles, is a director.

Middlesborough Belt Line.—Proposals are asked for building this standard gauge belt line of railroad which is to encircle the valley of Yellow Creek, at Middlesborough, Bell County, Ky., near Cumberland Gap. The distance will be about 12 miles, and coal, coke and iron ore will afford considerable traffic. Address bids to Alexander A. Arthur, General Manager, Middlesborough Town Company, Knoxville, Tenn.

Missouri, Kansas & Texas.—The directors of the road have approved a proposition for the reorganization of the company. It provides for an assessment of 10 per cent. on the stock and the refunding of the bonded debt, so that the fixed charges shall not exceed $1,500,000 per annum, the bondholders to receive preferred stock equal to the loss entailed by scaling down the interest. President R. T. Martinsen returned from Europe last week, where he had been visiting stockholders in London, Amsterdam and Frankfort. He says he has enough proxies to enable him to prevent the Missouri Pacific again securing control of the company. The directors propose to secure connections with Kansas City and St. Louis, independent of the Missouri Pacific, by securing the control of one of the several short lines which now have an entrance into Kansas City and by building a new line to St. Louis, if necessary.

Missouri, Tennessee & Georgia.—This company has been voted a subscription of $25,000 at Newbern, Tenn., to aid in building the road from Humboldt northwest to Newbern, Dyer County, about 25 miles. It is proposed to continue the line to the Mississippi River, and also to build southeast from Humboldt to northern Alabama.

Mount McGregor.—The company has filed articles of association in New York. It is formed by the purchasers at the recent foreclosure sale of the franchises and property of the former Saratoga, Mount McGregor & Lake George. The road to be operated runs from Saratoga to the Balmoral Hotel on Mount McGregor. The capital stock is $500,000; of this amount $325,000 is preferred and $175,000 common stock. The preferred will receive dividends from the net earnings of the company up to six per cent. per annum, noncumulative. Any excess of net earnings after the payment of its six per cent. dividend, shall be divided equally between the preferred and common stock. In order to pay off certain indebtedness a mortgage not exceeding $50,000 is permitted under the charter.

New Brunswick & Prince Edward Island.—Contracts will probably be let this summer for building a five mile extension of this road from its present terminus at Sackville, N. B., to Wird Point. This extension will give the road a water terminus and connect it with stone quarries. W. C. Milner, Sackville, N. B., is Secretary.

New York, Pennsylvania & Ohio.—The company commenced operating the New Castle & Shenango Valley road this week. The line was completed last year, but has not before been operated by the company, chiefly because the Pittsburgh & Lake Erie claimed that by so doing the company would violate an agreement which it had with the Pittsburgh & Lake Erie. The line is in western Pennsylvania, extending from New Castle to West Middlesex, Pa., 17 miles, and it is leased to the New York, Pennsylvania & Ohio, on a percentage of the gross earnings, interest on first and second mortgage bonds being assured.

Northeast Pennsylvania.—The project to extend this road from Hartsville to New Hope will probably fall through for want of financial support. Subscriptions amounting to only $28,000 have been received, while the minimum amount required by the Philadelphia & Reading road is $80,000.

Orange Belt.—The extension to Sanford, Fla., southeast from the former terminus at Monroe, was opened for traffic April 12. The line is four miles long.

Owensboro, Falls of Rough & Green River.—The grading on this line has been completed from Owensboro east to Whitesville, Davies County, Ky., and is in progress from that point southeast to Falls of Rough and Litchfield, connecting at the latter point with the Newport News & Mississippi Valley Road.

Pacific Short Line.—Bids for grading the first 100 miles of the road were opened April 15. Eighty firms put in bids. It will be several days before the award is made. The officers of the road announce that bids for grading 110 miles from the Wyoming terminus will be opened May 15.

Pennsylvania, Poughkeepsie & Boston.—The New York, Lake Erie & Western has given this company running rights over the Goshen & Deckertown road from Pine Island to Goshen, N. Y., a distance of 12 miles. On this road, between Slatington, Pa., and Pine Island, N. Y., and on the Hudson connecting road, between Campbell Hall and Poughkeepsie, grading and tracklaying have been nearly all completed, and it is expected that the entire line west of the Hudson River will be opened for traffic early in July.

Philadelphia & Reading.—The company will, it is stated, soon submit a new bill, asking for powers to build its proposed terminal road in Philadelphia. It is intended to meet in large part the objections to the old ordinance on account of the retention of surface tracks on Green street and Pennsylvania avenue. The new ordinance will provide partially for a subway and partially for an elevated road, the subways to be on Ninth street and on Pennsylvania avenue, and the elevated tracks at the terminals. It is said that the principal point yet unsettled is whether the company

or the city shall pay for the street bridges crossing the subways. The estimated cost of the bridges is about $250,000.

It is stated that Edward R. Wood, of Philadelphia, has received the contract for building the Philadelphia & Seashore Short Line road. The road will be operated by the Philadelphia & Reading, will be 35 miles long, leaving the Reading's Atlantic City branch at Winslow Junction. The distance from Sea Isle City to Philadelphia will, therefore, be 58 miles.

The company has given notice to the Philadelphia Stock Exchange that coupons will not be paid upon the third preference bonds, the holders of which have disputed the determination of the Board of Managers in regard to the amount of interest payable thereon, until the controversy is ended, and that, under the terms of the mortgage, the coupons maturing Feb. 1, 1890, will not be payable without the surrender of the coupons pertaining thereto, maturing Feb. 1, 1889. The company also gives notice that certain other coupons of the third preference bonds have not been paid, and sends the exchange the numbers of the bonds. It gives notice that the next coupons due will not be paid until the old coupons are produced and surrendered.

Pittsburgh, McKeesport & Youghiogheny.—Suits for damages against the company, entered by the estate of James H. Hayes, have been pending for several years in the county courts at Pittsburgh. The suits were for the appropriation of land of the Hayes estate. This week, by consent of both parties, judgments were entered against the railroad aggregating $293,500.

Red River, Sabine & Western.—The charter of this company, as amended, authorizes it to build an extension east from San Augustine, Tex., to Alexandria, La., about 110 miles, and west from Nacogdoches, via New Birmingham, Cherokee County, to Palestine, Tex., and thence toward Fort Worth. The Fort Worth Construction Co., of which John Ratican is President, has the contract for the entire line. That part of the line between Nacogdoches and San Augustine, 30 miles, will be completed first. San Augustine County has already subscribed $30,000 to aid in building the road, and it is expected that $20,000 will be subscribed by Nacogdoches County. There will be no bridges nor tunnels on the line, and the grade will be light. It is proposed to issue first mortgage six per cent. 50-year gold bonds to the amount of $20,000 per mile.

Richmond & Allegheny.—The property and franchises of the road were sold at auction in Richmond, Va., this week to Erwin Davis, Charles W. Cox and J. Kennedy Todd, of New York, representing the purchasing committee of the bondholders. The price was $5,000,000. These gentlemen represent a syndicate formed by the first and second mortgage bondholders, and were appointed by the syndicate to purchase the property, which will be turned over to the Chesapeake & Ohio and form a part of that system. The road extends from Richmond to Clifton Forge, Va., 230 miles. The obligations consist of $5,000,000 in first mortgage bonds, $4,000,000 in seconds and $5,000,000 in stock. The holders of first mortgage bonds will receive new bonds of the Chesapeake & Ohio, to bear 2 per cent. for five years and 4 per cent. for the succeeding 25 years. To meet these and other obligations the Chesapeake & Ohio will issue $6,000,000 in first mortgage bonds, $1,000,000 of second and $5,000,000 of income and mortgage bonds.

St. Cloud Sugar Belt.—W. S. Douglas, Kissimmee, Fla., is the contractor for the extension of this Florida road from its present terminus to Narcoosee, three miles. The work will be commenced at once.

Samish, Skagit Valley & Spokane.—This company has been organized in Washington Territory to build a line from Samish, Skagit County, on Puget Sound, southeast to Spokane Falls, in the eastern part of the state. The capital stock is placed at $3,000,000, and C. G. Austin, S. L. Bowman and E. M. Johnson are the incorporators.

San Antonio & Aransas Pass.—Johnson & Hanson, of San Antonio, Tex., have the contract for building the extension from near Comfort, Kendall County, northeast to Llano, Tex., a distance of 70 miles, and they are soon to commence the work of grading.

Seattle, Lake Shore & Eastern.—The Seattle & Eastern Construction Co. will increase its capital stock to $3,000,000. Of the $2,000,000 of new stock, $1,000,000 is offered to stockholders up to April 25. The money will be used to build the northern branch of the Seattle, Lake Shore & Eastern to a connection with the Canadian Pacific, and also for the completion of the Spokane Division.

Shenandoah Valley.—The Court of Appeals in the case of the Fidelity Insurance Trust & Safe Deposit Co. against this company has sustained the right of general mortgage creditors to the $1,560,000 bonds. In the second branch of the case, the appeal of the Car Construction Company, an opinion was delivered by Judge Lewis reversing the decrees of the court below on the ground that Virginia acts of Assembly giving priority of lien to those furnishing engines, cars and other supplies to railroad companies were void, because the title of the acts did not fully express the purpose and effect of the acts, as required by the constitution of Virginia, and reversing that part of the decree which gave a priority of lien to the holders of the income or third mortgage bonds and of the notes and other obligations of the Shenandoah Valley for moneys advanced by them to the railroad company. This decree sustains the rights of the bondholders under the general mortgage.

Southern Pacific.—The 29 mile extension recently completed by the company westward from Huron to Alcalde, in Fresno County, Cal., has been examined and inspected by the United States Government Inspectors, as it involves part of the company's land grant. The new line reaches a fine bed of coal in the coast range. It is understood that the company proposes to extend the road westward through the mountains to connect with its coast line, thus giving it another route from San Francisco to the San Joaquin Valley.

Stewiacke Valley & Lansdowne.—Donald Grant, of New Glasgow, N. S., who has the contract for building this line, expects to begin work this or next month, and then push the road to completion. The road is to extend from a point on the Intercolonial, 51 miles north of Halifax and 11 miles south of Truro, in Colchester County, follow the valley of the Stewiacke River, and through to Lansdowne, in Pictou County, a station on the Pictou branch of the Intercolonial, then to Westville, the centre of the coal fields of Pictou County, a distance of 50 miles. It is the intention to extend the line westwardly from near Truro, through Hants County to Newport, on the Windsor & Annapolis, a distance of about 48 miles.

The first 25 miles, from near Truro easterly, has been located and a preliminary survey to Lansdowne, 12 miles farther, has been made; the remaining 13 miles to Westville has not yet been surveyed, nor has the proposed extension westward from Graham's Siding on the Intercolonial. The Dominion Government and the Provincial Government have each given subsidies of $3,200 per mile for the first 25 miles, and in addition to this $6,400 per mile has also been secured.

Tennessee & Alabama.—This company has been organized at Winchester, Tenn., with a capital stock of $1,000,000, to build a road from Winchester southeast to Scottsboro, Ala., on the East Tennessee, Virginia & Georgia, a distance of about 35 miles.

Toronto, Hamilton & Buffalo.—This company proposes to build a road from near Toronto to Welland, Ont., west of Buffalo, N. Y., and it is endeavoring to raise subsidies from the various towns along the proposed route. Helm, Antonelle & Co., of Chicago, have the contract to build the road. E. C. Pew is President.

Union & Northwestern.—This company has been organized at Monroe, La., to build a line from a point at or near Vidalia, via Monroe and Farmerville, to Camden, Ark Engineers will be placed in the field at once to locate a route to the Arkansas line.

Union Rapid Transit.—This company has filed a charter in Illinois to build an elevated road in and about Chicago. Lines are projected to Kensington, with branches to Cheltenham Beach and South Chicago on the southeast and to the village of Blue Island on the southwest, also from a point in Chicago northerly through Evanston to the village of Glencoe. The capital stock is $6,000,000.

Weston & Elk River.—The surveys for this road will be commenced May 1, and contracts for constructing the line will be built soon after they are completed. This road is to extend from Weston southwesterly to Braxton C. H., on the Elk River, a distance of 42 miles. Hon. J. N. Camden, of Parkersburg, W. Va., is president.

Wyoming, Salt Lake & California.—This company, already incorporated in Utah, has filed articles of incorporation in Wyoming, with James E. Fulton, Thomas W. Bates, Theodore Brough, George O. Noble, Nicholas Treweek, Fred Simon and Robert Gardiner as trustees. The route is as indicated before, from a point ten miles north of Hilliard to Chalk Creek, thence to Salt Lake, etc.

TRAFFIC AND EARNINGS.

The Inter-state Commerce Commission.

INVESTIGATION OF PASSES, TICKET COMMISSIONS AND CAR MILEAGE.

The Commission has issued the following orders: In the matter of free passes and free transportation, the Commission has ordered the following roads, namely, the Boston & Albany, Boston & Maine, Baltimore & Ohio, Buffalo, Rochester & Pittsburgh, Central of New Jersey, Central Vermont, Delaware & Hudson Canal Co., Delaware, Lackawanna & Western, Fitchburg, Grand Trunk, Lehigh & Hudson River, Lehigh Valley, Maine Central, New York & New England, New York Central & Hudson River, New York, Lake Erie & Western, New York, New Haven & Hartford, New York, Ontario & Western, New York, Philadelphia & Norfolk, New York, Providence & Boston, New York, Susquehanna & Western, Pennsylvania, Philadelphia & Reading, Providence & Worcester, Rome, Watertown & Ogdensburg, Western New York & Pennsylvania, and West Shore, to appear before the Commission on May 3, to set forth the persons and classes of persons to whom they have issued free passes or free transportation to persons other than officers or employés, or the officers and employés of other railroads, and all the conditions and limitations connected therewith in each instance, and how they do this branch of their business.

In the matter of commissions on the sale of tickets the Commission has ordered the following roads, namely, the Burlington, Cedar Rapids & Northern, Chicago & Alton, Chicago, Burlington & Quincy, Chicago, Burlington & Northern, Chicago, Burlington & Kansas City, Chicago, Kansas & Nebraska, Chicago, Milwaukee & St. Paul, Chicago & Northwestern, Chicago, Rock Island & Pacific, Chicago, Santa Fe & California, Chicago, St. Paul & Kansas City, Chicago, St. Paul, Minneapolis & Omaha, Wisconsin Central, Chicago & Atlantic, Chicago & Grand Trunk; Detroit, Grand Haven & Milwaukee; Detroit, Lansing & Northern; Flint & Pere Marquette; Illinois Central; Lake Shore & Michigan Southern; Louisville, New Albany & Chicago; Michigan Central; New York, Chicago & St. Louis; Pittsburg, Fort Wayne & Chicago; Wabash, and Wabash Western, to appear on May 7, to set forth what commissions, if any, each of them pays upon the sale of passenger tickets, and to whom, and how this business is conducted.

In the matter of trackage and car mileage each of the roads in the last list is ordered to appear before the Commission on May 8, to state what allowance, if any, each of them pays for trackage and to whom in each instance, and how this is done; and what allowance, if any, each of them pays for different classes of cars furnished by shippers, car companies, individuals or connecting lines, and how this business is conducted, and as to what is a fair and just allowance for such different classes of cars.

Traffic Notes.

The Union Pacific has caused a lively discussion among transcontinental roads and their Chicago connections by putting on sale tickets for Puget Sound points via the Oregon Short Line and over the Northern Pacific from Portland northward. The agreement between the two lines has been that all passenger traffic for the Puget Sound region should be given to the Northern Pacific. As the transcontinental rate to Portland is the same as to Tacoma, and as the fare from Portland to Tacoma is $6, the action of the Union Pacific is regarded by its competitors as a reduction of that amount in the rate.

One-way party rates have been abolished in the territories of the Central Traffic and Trunk Line Associations. The abolition was officially announced in a formal notice issued by Chairman Blanchard. The reason for this action seems to be the memorandum from the Inter-state Commerce Commission declaring such rates vicious.

The Missouri Railroad Commissioners have ordered the railroad companies of that state to provide rates on live stock by the car load, as was done previous to the recent agreement to charge in all cases by the 100 lbs. This opinion is based on the fact that the state law expressly prescribes a carload rate.

A Chicago dispatch states that the Western Freight Association will advance west-bound through rates to Iowa points by way of junction points south of Chicago to the level of the tariff via Chicago.

A St. Paul paper says: The lake and rail merchandise rates west-bound are as follows: From New York to St. Paul, 89, 80, 63, 41, 35 and 30 cents, and from New York to Duluth, 70, 61, 47, 33, 29 and 24 cents. These rates will be in force via Duluth, Washburn, Gladstone, Milwaukee or Chicago, over any of the ten different lines doing business in St. Paul. It has never occurred before that the same rates have been agreed upon via all routes.

The Atchison, Topeka & Santa Fe has 487 freight cars on its side tracks at Arkansas City, Kan., which are being loaded with implements household goods, merchandise and houses, framed and ready to be put up in Oklahoma.

The request of the Chicago, St. Paul, Minneapolis & Omaha for the establishment of rates to Duluth on the same basis as those to Chicago from Northern Nebraska; the Chicago & Alton's appeal to arbitration in the fast train controversy and the disagreement of the managers on the question of lumber rates from Chicago to Southwestern Missouri River points will be considered by the Inter-state Commerce Railway Association at special meetings in Chicago, April 23 and 24.

The Trunk lines have agreed to accept lower proportions on freight rates from the Atlantic seaboard to points west of Chicago. The proportions east of that city have been reduced as follows (the basis hitherto having been 70 cents first class, New York to Chicago): first and second classes, 3 cents; third and fourth, 2 cents; fifth and sixth, 1 cent.

Irregularities have been discovered in the second-class sleeping-car rates between Chicago and the Pacific coast. The regular rate is $4 per berth and the Santa Fe road has been charging this price, but the Rock Island and the Denver & Rio Grande run similar cars between Chicago and Ogden and make no charge for berths, so that the passenger pays only $1.50, the rate from Ogden to San Francisco. The Union Pacific has now met this competition by announcing a rate of $1.50 from Omaha and $2.50 from Chicago. It is said that the Union Pacific has to allow the Pullman company the regular rate of $3 from Omaha to San Francisco.

Lake and rail rates on grain from Chicago eastward have dropped to 8 cents a bushel on corn to Boston and 7¾ to Baltimore and Philadelphia. It is said that the reductions were made without giving the three days' notice required by law.

Cleveland Weighing and Inspection Bureau.

The March report of this bureau has the following figures. In January an excess weight of 4,232,470 pounds, or 17 18 per cent. was discovered in shippers' weight of 24,153,894 pounds: in February, with shippers' weight of 32 224,-966, the excess discovered was 3,967,851, or 12.31 per cent.; in March the shippers' weight was 24,953,874 pounds, the excess weight 7,026,060 pounds, or 28.55 per cent., a gain of over 100 per cent. in the percentage.

Following are the figures for March in *thousands* of pounds:

Road.	Shippers weight.	Actual weight.	Excess over shippers' weight.	Per cent. of excess to shippers' weight.
L. S. & M. S....	9,860	13,030	3,170	32.15
Pennsylvania ...	6,244	8,407	2,162	34.63
N. Y., C. & St. L.	6,391	7,719	1.328	20.78
C. C. C. & I.....	1,215	1,373	157	12.87
N. Y., P. & O....	687	777	89	12.77
Valley.....	538	653	115	21.35
Empire (Lake)...	16	18	2	14.83
Total.....	24,954	31,980	7,026	8.55

When on examination by the inspector the shippers' and the actual weight were the same, or when the shipper gave no weight, no report was made. The 24,954,000 pounds represents only the freight which was found to have been actually underbilled by the shipper.

The International Traffic Association.

The future of the International (late the Texas) Traffic Association is still in doubt. The Texas legislature has passed a law declaring such an association to be an unlawful combination. A committee has been appointed to devise some plan by which the roads can agree on methods of business without running counter to the decision that such an agreement is a conspiracy. One scheme is to reorganize an association with headquarters at St. Louis.

Rules for Changing Destinations.

The Central Traffic Association announces the following regulations:

Resolved, That whenever through consignments of traffic are delivered to Eastern lines, and a change of shipping directions or destination is desired or demanded, only one such change shall be permissible, and then only when such change of shipping directions or destination is concurred in by the roads over which the freight may have passed and to which it may be delivered, and when it is made at one of the junctions designated as inspection stations under the supervision of the inspectors of the joint rate committee, who shall by proper correction adjust the freight charges of both delivering and forwarding railways to conform to the established tariff rates and divisions from original point of shipment to such desired destination, and the authorized through rate and divisions of same to be thereby maintained. Such changes shall only be made upon surrender of original bill of lading or receipt issued therefor. No change in shiping directions or destination shall be permissible when the detentions at junction points exceed 72 hours on any car, or when the grain has been in transfer elevators over 72 hours. Not less than local rates to and from junction points of delivering and forwarding lines should be charged on grain to be cleaned or mixed in transit.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, April 13, amounted to 42,194 tons, against 45,577 tons during the preceding week, a decrease of 3,383 tons, and against 56,039 tons during the corresponding week of 1888, a decrease of 13,845 tons. The proportions carried by each road were:

	W'k to Apr. 13.		W'k to Apr. 6.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	4,944	11.7	4,344	9.5
Wabash.....	4,442	10.5	4,813	10.6
Lake Shore & Michigan South.	4,366	10.4	4,557	10.0
Pitts., Ft. Wayne & Chicago...	5,568	13.2	5,757	12.6
Chicago, St. Louis & Pitts.....	6,279	14.9	6,154	13.5
Baltimore & Ohio.....	2,740	6.5	2,345	5.1
Chicago & Grand Trunk.....	5,526	13.1	9,912	21.8
New York, Chic. & St. Louis...	2,513	5.9	2,895	6.3
Chicago & Atlantic.....	5,816	13.8	4,800	10.5
Total.....	42,194	100.0	45,577	100.0

Of the above shipments 2,580 tons were flour, 12,346 tons grain, 2,610 tons millstuff, 3,469 tons cured meats, 2,023 tons lard, 7,329 tons dressed beef, 1,297 tons grass seed, 830 tons butter, 1,327 tons hides, 44 tons wool, and 5,804 tons lumber. The three Vanderbilt lines carried 28.0 per cent., while the two Pennsylvania lines carried 28.1 per cent.